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Important Supreme Court Decision in Relation to Patents.

TO THE EDITOR OF ELECTRICAL REVIEW:

The recent decision of the Supreme Court of the United States in Pohl *vs.* Brewing Company is of great interest to all those who are in anywise interested in patents, for the reason that there is probably no section of the United States Statutes relating to letters patent that has caused such annoyance to patentees and owners of letters patent as section 4887. The provisions of the section are:

"Every patent granted for an invention which has been previously patented in a foreign country shall be so limited as to expire at the same time with the foreign patent, or, if there be more than one, at the same time with the one having the shortest term, and in no case shall it be in force more than 17 years."

To understand the objections to and points of ambiguity of this section, a knowledge of the features of the patent laws of many foreign countries is requisite. Canada and Austria, for instance, grant patents for different lengths of time. Canada for 5, 10 and 15 years; Austria, from one to 15 years; England, 14 years; France and Germany, for the single term of 15 years. In those countries where a patent may be obtained for different lengths of time, the short terms may be extended for any part of the full term. Foreign patents, unlike American patents, require the payment of a yearly tax, and are likewise subjected to various other conditions subsequent, such as "The device described in the patent may not be imported into the country at all," or, after a specified time, "The device must be put into use (worked) in the country within a certain time." The failure to comply with any of the conditions subsequent, entails the forfeiture of the patent. In some countries the patent becomes void by reason of the failure to observe these conditions; in other countries, is voidable by instituting a proper action.

Foreign patents in many countries take their date from the time of their deposit in the patent office. In other countries, from the date of the allowance of the patent. The first important question which arose in the courts regarding this section related to the word "patented" or "previously patented," as used in the statute, the question being, when was a foreign patent *previously patented?* It was held in Bates *vs.* Gillette 13 Federal Reporter, 553, to mean that a foreign patent was previously patented if the date of the foreign patent, that is, the time when the patent began to run, was prior to the date of the issue of the American patent. This was held to be true, irrespective of the dates of the respective applications in the different patent offices.

The second question, and really the most annoying one, related to the meaning to be given to the word "expire"; *i. e.*, when did a foreign patent expire? For instance, in the case of a Canadian patent granted for five years, and extended for the balance of the term, it was held in Bate Refrigerator Company *vs.* Hammond, 129 U. S., 15, that the Canadian patent did not expire at the end of the first term, provided the renewal fee for the second term was paid prior to the expiration of the term.

The third question also related to the same word "expire"; in other words, did a patent expire if the yearly annuities were not paid within the required time, and, further, did the failure to observe any condition subsequent entail a forfeiture of a patent, and so cause its expiration? The Supreme Court, in Pohl *vs.* Brewing Company, has just decided, it is understood—the opinion not yet having been published—that the failure to observe any conditions subsequent does not in effect constitute an expiration of the foreign patent in the sense in which the word "expiration" is used in section 4887.

From the above decision, it, therefore, appears:

1st. That a foreign patent to be "previously patented," and to limit the term of American patent, must be dated or begin to run prior to the issue of the American patent.

2d. That a foreign patent taken for a short term, and in which the renewal fee has been paid before the expiration of the term, does not expire until the end of the renewed term, and the American patent issued subsequently has a lifetime equal to the extended term of the foreign patent.

3d. That a foreign patent issued for a short term, if allowed to lapse by failure to extend term, will expire in the sense of section 4887, and, hence, an American patent issued subsequently will expire with it.

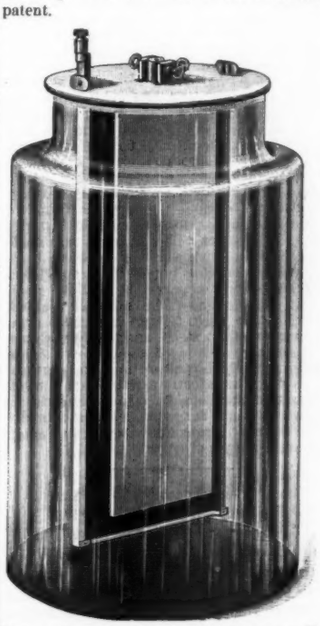
4th. That the failure to pay fees, to work the patent in the country within the specified time, or having unlawfully introduced a patented device into a country, or, in fact, the neglect of any conditions subsequent, will not affect such an expiration of an American patent as is contemplated by the term "expire," in section 4887 of the statute.

There is some doubt as to the present standing of the division 3, mentioned above. It is possible that the recent decision has cleared up this doubt, and that an American patent will only expire with the longest term for which a foreign patent may be obtained.

The effect of this decision will be most pronounced and very beneficial. Almost every inventor gets a "bee in his bonnet" and rushes off, both before and after obtaining his American patent, to obtain a large number of worthless foreign patents. Where the foreign patents were filed prior to the American patents, it has in many cases turned out that they were valueless; but the unfortunate inventor was obliged to sustain them in order to keep his American patent alive. Probably over a million and a half of money a year has been paid out by inventors in this country for maintaining worthless foreign patents.

Yours truly, GEO. H. BENJAMIN.

New York, March 31.



FIGS. 1, 2 AND 3.—DIFFERENT FORMS OF EDISON-LALANDE BATTERY.

The New Edison-Lalande Battery.

Our illustrations on this page show a few of the various sizes of the Edison-Lalande battery which is meeting with such success. Fig. 4 shows the method of setting up. Its uses are numerous, including all classes of closed and open circuit work, electroplating, telephone transmitters, etc. This battery is said to have an internal resistance of only .025 ohm and permits a discharge of 15 amperes, with an inappreciable loss by local action. It gives an E. M. F. of about one volt, is free from polarization and never needs cleaning.

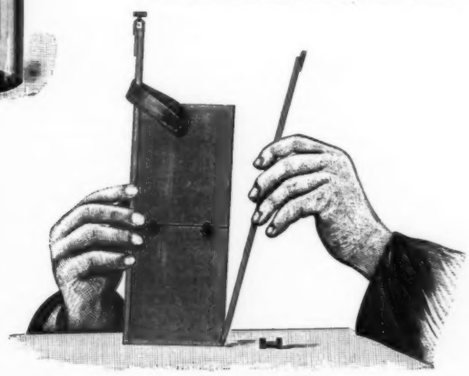


FIG. 4.—MANNER OF SETTING UP.

Certain courts are at present trying to decide whether or not electricity is manufactured. If it is manufactured, the producers in numerous States are liable for taxation. Benjamin Franklin held that the electric fluid was not manufactured, but was taken from one body to be delivered to another, and that practically nothing was lost in the transition. Scientific men of our own day have held this to be true in a broad sense. Here is something for the courts to go upon in rendering their decisions.

Thomson Electric Welding Company.

It has heretofore been remarked that the Thomson Electric Welding Company had taken out patents which might form the basis for the organization of a new welding company, but particulars have not until now been accessible. It appears that about four months since, Lieut. W. M. Wood, of the United States Navy, who is on leave of absence, and associated with the Thomson Welding Company, conceived the idea of manufacturing projectiles by the electric welding process, with a view to secure better results than have been heretofore obtained by any other process and at a saving of expense. The idea was wrought out, and patents for this purpose have been granted. Heretofore the government has had to bore solid metal at great cost. By the process, as governed by the patents, a steel tube of the proper length and thickness is welded to the head and then to the butt of the shell, thus in a few moments accomplishing what now requires hours of costly machine labor. The process is varied according to the class of shell or shrapnel to be manufactured, all details of which are covered by the patents which the company holds. It is the plan of the management to organize a separate company to develop these special patents, the revenues of which shall flow directly to the stockholders of the Thomson Welding Company, and as the necessary experimenting has already been done, active measures will be taken to commence manufacturing without delay, the works to be located at Lynn, Mass. Large contracts for government shell are already awaiting the formation of the company. The Thomson Electric Welding Company has taken out similar patents in all foreign countries, and that department will receive attention later. The old, or parent, electric welding company is arranging to supply welding plants at the navy yards in Brooklyn, Norfolk and Washington, and a recent dispatch says that an item of $12,000 has been reported to the House by the naval committee in the appropriation bill for a chain welding plant for the Charlestown Navy Yard.

The Julien Electric Traction Company, incorporated under the laws of New Jersey, has decreased its capital stock to $750,000 and the par value of the stock to $25.

Electrical Fish.

DENIZENS OF THE DEEP SEA WHO POSSESS POWERFUL BATTERIES AS WEAPONS.

Some years ago a young man, in all the glory of his first knickerbockers, found himself in a small fishing village on the New England coast, and, liking the location, determined to spend the season there. The morning following his arrival, he ran down to the beach, where he found a crowd of red-shirted men gathered around a flat fish about three feet in length. "We're tryin' to get some one to heft it," said an old seadog, in answer to a question. "Lift it! Why, a child could do that," remarked the young man from the city.

"P'raps he could," replied the fisherman, "but if you kin lug the fish from here to the dory over yonder, you kin earn five dollars."

"You're a fine lot of men," said the city youth, with a laugh; "can't lift a fish of that size! Why, I'll wager the same amount that I can throw it that far."

The fishermen were very anxious to take the wager, and finally the young man approached, thrust his fingers into the eyes of the fish, and, if it had been any other fish we might have said, prepared to throw, but as it was, the moment his hands touched the fish a strange look of surprise came over his face, and those near by might have seen a certain rigidity of the muscles. He retained the same position for several moments, then, with many a grimace, asked to be relieved, and amid roars of laughter, the fish was pulled from his hands. When the young man had recovered his equanimity, he confessed that it was the heaviest fish he had ever attempted to lift.

The fish was the ray, known popularly as the torpedo (*torpedo marmoratus*), and one of the most powerful of the marine electricians. The moment it was touched the shock was so severe as to completely disarm the victim. These rays are often struck by fishermen by mistake, and the shock is immediately felt, passing up the handle or line of the spear. An acquaintance of the writer was disabled for several days by a shock received in this way, which will convey some idea of the power of these fishes.

Hundreds of years ago we hear of the Italian fishermen being benumbed by the shocks of the torpedo, though they often laid it to other causes. Others recognized its power, and called it the thunder fish.

It is said that the physician of Cleopatra, Deoscorides, used these fishes in medicine, and Dr. Walsh, F. R. S., was probably the first to introduce its use in England. It was no doubt brought to his notice by itinerant showmen, who exhibited the torpedo upon the beach in tanks, and gave torpedo shocks, charging them a penny for the unpleasant infliction.

The experiment of Dr. Walsh created a craze that swept over this country some few years ago. The most extravagant stories were circulated about the fish and its marvelous powers of curing, and it became a fashionable fad to go to the Isle of Re and take an electric shock from the fish of Dr. Walsh. The performances took the form of a piscatorial instead of a spiritual nature.

The living torpedo in these experiments was placed upon a wet towel, and from the fish extended two pieces of wire, the ends of which rested in bowls of water. A circle of persons was formed, those upon the end placing their fingers in the water, and in this way the shock was received by the entire party, and often equaled that of a Leyden jar in its intensity.

In examining the torpedo the electrical apparatus is very noticeable, being made up of two large, flat bodies lying on each side of the head. The organs are composed of numerous prisms placed vertically, each of which is subdivided by delicate septa, forming small cells, which contain a clear, tremulous, jelly-like substance. In a specimen of *torpedo marmoratus* one may count nearly 500 of these prisms.

It has been found that the upper side of the fish is negative and the lower positive, and that the power is entirely at the will of the fish or under its control. Some curious experiments have been made; thus, the scientist, Marez, applied a telephone to the fish, and at every ordinary shock given he distinctly heard a click. When the fish was greatly excited, a loud groan was heard, which sounded like mi, and the discharge was prolonged four or five seconds.

Such a remarkable contrivance can but impress the beholder with the fertility of the resources of nature. Evidently protective and defensive, it enables the sluggish creature to capture certain prey and to put to flight enemies many times its size. The electrical discharge of this fish is not of sufficient power to kill a man, unless he was in an extremely enfeebled condition, but that it is fatal to other fishes has been noticed on many occasions. Moreau, a French observer, noticed turbot fall upon a torpedo in a fishing boat, and the result was almost instantaneously fatal. They leaped high in air upon receiving the shock, and fell back dead and rigid, and remained for some time bent in a curve.

In appearance the torpedo is a flat fish, with a rounded head and short, thick tail. It has a wide distribution, six genera and about 15 species being known. They occur in the Atlantic and Pacific oceans, although all are not supplied with as powerful a battery. The torpedo is often brought into Fulton market, New York, where its powers are used to make sport for the fishermen, who watch with delight the emotions of the victims.

The electricians among the animals are not confined to the ocean, one of the most formidable being found in the fresh water streams of South America. This fish is a large eel, known as the *gymnotus*. In 1671, a French scientist visited the Amazon country, and was told by the natives that there existed a fish in the tributaries of the great river that could kill men and horses by simply touching them, charming they expressed it.

Richter naturally considered the story as a fable and refused to believe it until he had been "shocked" by a small fish. When the naturalist reported the discovery in France he in turn was laughed at, and little or nothing was known about the *gymnotus* or its powers until the time of Humboldt. In traveling through South America he heard that the fishes were often captured by first disarming them by driving wild horses into the water.

Humboldt thus describes such a fishing: "I wished," he says, "that a clever artist could have depicted the most animated period of the attack. The groups of Indians surrounding the pond; the horses, with manes erect and eyeballs wild with pain and fright, striving to escape from the electric storm which they had aroused, and driven back by the shouts and long whips of the excited Indians; the livid yellow eels, like great water snakes, swimming near the surface and pursuing there enemy—all these objects presenting a most picturesque and exciting ensemble.

"In less than five minutes two horses were killed. The eel, being more than five feet in length, glides beneath the body of the horse, and discharges the whole length of its electric organ. It attacks at the same time the heart, the digestive viscera, and above all, the gastric plexus of the nerves. I thought the scene would have a tragic termination, and expected to see most of the quadrupeds killed; but the Indians assured me that the fishing would soon be finished, and that only the first attack was formidable. In fact, after the attack had lasted a quarter of an hour, the mules and horses appeared less alarmed; they no longer erected their manes, and their eyes expressed less pain and terror.

"One no longer saw them struck down in the water, and the eels, instead of swimming to the attack, retreated before their assailants and approached the shore. The Indians now began to use their missiles, and by means of a long cord attached to the harpoons, jerked the fish out of the water without receiving any shock, so long as the cord was dry."

Ordinarily, the *gymnotus*, or electric eel, ranges from two to five feet in length, but specimens have been reported as attaining a length of 20 feet, and it is supposed that an animal of this size could readily kill a horse and rider; in fact, such an occurrence has been reported, but, lacking confirmation, should be received with some allowance, due, in any case, to the habit of exaggeration found among many native tribes.

Small specimens of the *gymnotus* have frequently been brought to the United States, and in one experiment a duck was killed by being forced to swim over it. The electric batteries, if so we may term them, consist of two pairs of longitudinal bodies, situated immediately below the skin, one pair on the back of the tail and the other near the anal fin.

It is said that some years ago a small fruit schooner bound from South America to New York, put in to Bermuda for supplies. The captain was taking a pair of large eels to an aquarium in New York and had them on deck in a large tank which was marked "E. Eels; Dangerous." The skipper was greatly annoyed by the colored people, who swarmed over the decks at all hours, sampling the bananas and other fruits and making themselves generally obnoxious.

One evening he was relieved of this nuisance in a somewhat singular manner. A big, burly citizen of Her Majesty was walking about the deck sampling things with a friend, when his eye caught sight of the eel tank, and after some difficulty, with the aid of his friend, made out the legend. "Hit mus' be curus eels fur to be dangerous. Do they bite?" he asked of a deck hand. "Regular man-eaters," was the reply. "Yo' can't fool dis child," continued the darky, "I'se been in the eel business too long."

"I'll tell you," said the skipper, who had heard the remark, "if you will take one of them eels out of the tank I'll give you the best bunch of bananas on the schooner."

This was enough for the inquisitive Bahamian, and lifting the tin cover he thrust in his arm, felt around a moment, then, with a roar like a mad bull, fell staggering back upon his friend, and screaming that he had been voudooed, rushed to the wharf and was never seen there again. He had received a shock sufficient to stun a horse and believed himself bewitched.

Some years ago a missionary on the old Calabar River, Africa, in passing through a village observed an infant in a bath-tub, screaming as if in the greatest torture. Approaching he found the cause to be a small black or olive-hued fish, which swam about as if it, too, was alarmed. Investigation showed that the fish was the electric catfish, *malapterus*, found in many African rivers, where they are called raad or thunder, by the Arabs, and Ishenza, by the natives of the Niger.

The natives of the old Calabar River were familiar with its electrical properties, and considered that it had the power of stimulating the system or adding to the strength and courage, hence the children, especially the males, were put into a bath and made to handle the fish, and consequently received the shocks, which, as far as the writer's experience goes in handling two fishes, is slight.

These little electricians were also placed in baths for the benefit of persons sick in various ways, and probably were, in some instances, productive of more or less good. The *malapterus*, as it is known to science, ranges from six to eight inches in length, and resembles our ordinary catfish in many respects. Some years ago several were brought to New York and exhibited in the aquarium here; but the shocks they gave were weak and would be o little use as a protection; undoubtedly, long confinement in the tank had affected their powers.

Probably there are many fishes which have electric powers to a more or less extent. One of the curious trunk fishes found in Southern waters possesses electric batteries of no little power. The discovery was made by accident. An English officer was collecting specimens, and perceiving a small fish moving slowly about in a shallow pool, seized it, whereupon he received a shock which made itself felt up his entire arm, showing that it was of no little importance as a defense. Some of the deep-sea fishes and others which venture near the surface, as *scopelus*, have certain pearly spots upon them that are considered to be electric organs by certain scientists, and undoubtedly this strange protection exists in many instances not yet observed.

Electrical Inventions.

[Written for the ELECTRICAL REVIEW.]

The ingenuity of the Americans has become proverbial, but despite all their acuteness, there exists a vast amount of ignorance, both as to the best method of directing their faculties and the ultimate proper protection of their ideas. The tendency is to a wasting of energy for the production of impractical schemes, and the lack of a little thought to render them useful and efficient. A gyration, as it were, between theoretical considerations and practical results. In electrical matters, this is no less largely apparent. A comparison between the studied nicety of the schemes which reach us from abroad, and the crudeness of our own bold, though unworked out designs, will render this clear. But it is solely the aggregation of these strokes of thought that renders the American intellect foremost and invincible.

In leading forth in a new path, in branching from the old rut of practice, our greatest sins are the lack of efficiency and the neglect of those careful considerations which combine to render an action productive of result. We must combine that which adds to and eliminate that which detracts from efficient operation, sacrificing one for the other, in such a proportion as seems best suited, in order to form one polished whole. To preserve a balance, and sacrifice efficiency for economy, and *vice versa*, to reconcile all the warring elements into harmony, is the true aim and object of invention. To merely convert an electric current from a high to a low potential, by means of an inductorium, is but a short step. But to so proportion the iron as regards saturation, and the number of coils suitable for the varying conditions of practice, in order to secure regulation is, without doubt, invention of the highest type.

In schemes of a visionary nature, one great fault is the numerous conversions of energy. The fact needs to be brought home, that almost every conversion is in the highest degree wasteful. Friction, heating, and the numerous faults of mechanisms, all absorb their quota of energy, while it is of the greatest importance that actions consuming power, should not be multiplied. Complications must be, as far as possible, avoided; apparatus consisting of many parts is liable to get out of order. The liabilities vary in direct proportion to the number of parts. Simplicity should be studied and efforts be made to reach the fundamental principles, to look further and further beyond results, and study the atomic causes. The further back we reach, and the nearer we approach to primal actions and differentiate them, one from the other, the more perfect will be our achievements. There is no denying the fact that those dynamo regulators which depend for their action upon the government of the lines of force themselves, are most efficient and rapid to respond to changes. And thus it is with every such apparatus.

It is not sufficient to know that a certain winding will, under certain conditions, produce certain results, but when we look behind this, and search diligently till we learn all the causes and actions which combine for its achievement, we will have established a base for future reasoning, and a prolific source for that mutation of effects which constitutes invention. Therefore it may be laid down as a proposition that the deeper we go, and the more science we put into our devices, the more perfect they will be rendered. Mere theory within certain limits is often at variance with practice, but theory which is certain and perfect forms the only safe criterion of operativeness.

But it is not upon complicated mechanisms and profound reasoning that inventions have to rely for their merit. Many inventions derive their value from their very simplicity, often only an ingenious designing to accomplish a new result in a new way, a mode of operation *sui generis*, the outcome of a mental process and adaptation; simple because the mind has fully grasped what has gone before, useful in that it is a new way out of a labyrinth, a solution of a problem in another direction than the accepted path, grateful because unexpected. Let it be noticed that even in all these there is a faithful adherence to first principles, a combination of old with new, a progression and a recedence, as though the progress of invention was in an epicycloidal line, returning often to intersect at a point that is past before attempting a new flight into the beyond.

Another stimulus to electrical invention is necessity. A growing art is full of imperfections, and must ever give rise to minor difficulties which suggest the contrivance of devices which are trivial in themselves, but great in their applications, devices which fill the want in hand, but are rapidly superseded by others more polished and improved. It is to these largely that profit accrues to the inventor. It is seldom that a really great invention is of profit in a pecuniary sense. A great benefactor of all men is often least rewarded. To confer a benefit on mankind is to have yourself set up to ridicule, your rights disputed, your probity doubted, and your very soul harassed cut by the continual strife to protect that which is your own.

Favorable comment must be excited from the fact that the electrical arts are singularly free from inventions of a purely frivolous or trivial character. Everything seems to have some definite end to subserve. True, there are things which are not looked upon with favor by the fraternity, such for instance as some classes of medical appliances, but from what we know of electrical actions the means are not wholly inadequate to the end; there may come a time in the near future when electricity will be of the greatest importance in medicine. The results which are aimed to be brought about are not at variance with known actions, and we cannot say what may yet be discovered—there are apparently no impossibilities in the electrical science.

All these considerations lead to the conclusion that our field is limitless, and while we may be pleased each day to regard ourselves near the limit of our knowledge, we are each time astounded at the development of an idea which, although it does not shatter our preconceived notions, at least adds its quota to that knowledge which confirms us in our belief. G. Ev. M.

Washington, D. C., April 2.

The Thomson-Houston Company now has contracts for 114 motor cars and the equipment of 106 miles of track.

The Walker Electric Meter.

The importance of having some electrical instrument or meter that will correctly and properly record the amount of current passing through it for an extended period of time, is admitted by all parties interested in the question of electricity or its use, as being absolutely necessary. It is also a well-known fact that the best means of measuring the

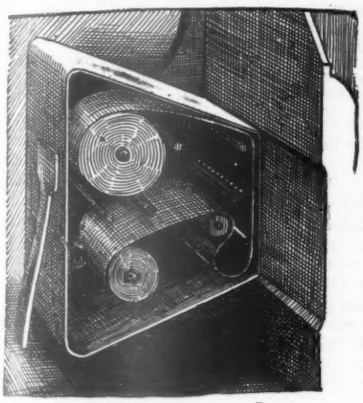


FIG. 2.—THE RECORDING STRIP.

quantity of current is the ampere meter. Various means have been devised by inventors to cause the needle or indicating part of the ammeter to record its actions by means of a syphon pen or pencil.

The Walker meter consists essentially of an ammeter of any well-known type; preferably one that would read in equally divided spaces. A very simple clock movement to move a strip of sensitized paper which is contained in a removably fitted box, and an incandescent lamp to throw the shadow of the needle or indicating portion of the meter upon the sensitized paper. The record of the needle's action is thus taken without interfering in the slightest possible manner with the operation of the ammeter. The record thus made is naturally correct because it is an absolute transcript of the action of the needle.

In the practical operation of this meter, simple means have been provided to automatically wind the clock at pre-determined times. It is also so arranged that all action ceases as soon as current fails to pass through the meter; that is to say, the clock will stop and the light go out. This will automatically start again, if as little as one-sixteenth of an ampere current passes through the meter.

Some of the advantages claimed for this meter are as follows:

1st. The entire amount of current consumed is measured.

2d. The record is in the shape of a monthly diagram showing exactly how much current

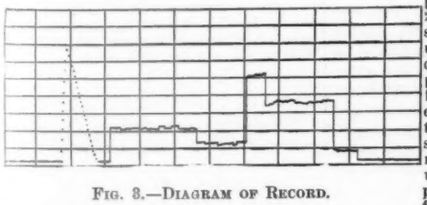


FIG. 3.—DIAGRAM OF RECORD.

has been consumed in a detailed matter.

3d. The record is permanent, and can be used for future reference, or, in case of any question as to the correctness of the monthly bill, will be convincing in its proof.

4th. Climatic changes do not affect the meter. It will operate equally as well in a damp, cold cellar as in a warm room.

5th. Its simplicity of operation. Once a month the box containing the record is removed and another box put in its place; this work can be accomplished by a boy.

6th. When all the records have been collected, they would be put in a bath and fixed; this latter operation is not only simple, but inexpensive.

7th. The loss in operating this meter is confined to the energy to burn one lamp in the meter, which, at the candle-power used, takes one-sixteenth of an ampere. This is the maximum loss, whether one or 1,000 lamps are being measured.

At Mr. Walker's request, Mr. Geo. B. Prescott, Jr., electrical engineer, made a critical examination and series of experiments with this meter. In the report on these tests, the following passage appears:

"It is evident that the accuracy of a current meter must depend primarily on the sensitiveness of the indicating portion of the device, as well as on the proportionality of its indications; that is to say, the indicator must respond to minute variations in the current strength and must also move through equal intervals over its scale for equal increments of current, whether one lamp or 100 lamps are burning. From the tests which I have made, this meter appears to fulfill both of these requirements, for when tested by comparison with a carefully standardized Weston ammeter reading to hundredths of ampere, it agreed remarkably well both on rising and falling currents. These tests extended through the full range of the instrument, and the load was varied by single lamps taking from $\frac{35}{100}$ to $\frac{47}{100}$ ampere each, these small differences being distinctly recorded.

"Without the frictionless characteristics of the recording device, the extreme sensibility indicated above could never have been secured. If the core or pointer had been required to do any mechanical work, such as making an ink line, as is commonly done in instruments of this class, its sensibility would have been greatly reduced, both by the weight of the recording device as well as by the consequent friction."

Rejoicing Over the Electric Light.

Mauch Chunk, the capital of the American Alps, has just been provided with an electric light plant, and how much the citizens are elated over the innovation in the lighting of their streets can best be judged from the following article, which appeared in the Mauch Chunk *Daily Times*, of March 28:

"The streets of the Switzerland are now illuminated by electric light. The arc dynamo was run yesterday evening for the second time, and the 40 lamps that are planted throughout the 1st and 2d wards and East Mauch Chunk shed forth their brilliant rays until quite a late hour, to the delight and pleasure of all our people, and to the evident satisfaction of the managers of the electric light company 'Ain't they daisies?' 'It's a great success.' 'What a big improvement.' These, and a whole column of similar expressions of praise, could have been gathered from people on the streets who were watching the inauguration of the system.

"As has already been stated in these columns, the system used by the Mauch Chunk Electric Light Company is the Westinghouse. That company has evidently erected a plant here that may be rightly and justly esteemed to contain the highest attainment of the present day in electric lighting.

"This may be said of the incandescent plant which has now been in operation for some time, and is also true of the arc plant, as was shown by the bright and steady rays from the street lamps yesterday evening and the evening before. It would seem as though the 'flickering' of the street lamp and the wave from a bright light to a dimmer one, so usual to all other systems of street lighting, had been entirely overcome by the system adopted by the Mauch Chunk company.

"We are informed by Mr. Jarrard, the superintendent of the electric light company, that the street lamps and the wires throughout the town have all been put up at the company's own expense, and that the streets will be lit free of charge until April 1st. The matter will then be presented to town council for their adoption or rejection. As to what action that body will take we have no knowledge, but we do feel sure that the large majority of the citizens and taxpayers hope that council will see its way clear for a speedy adoption."

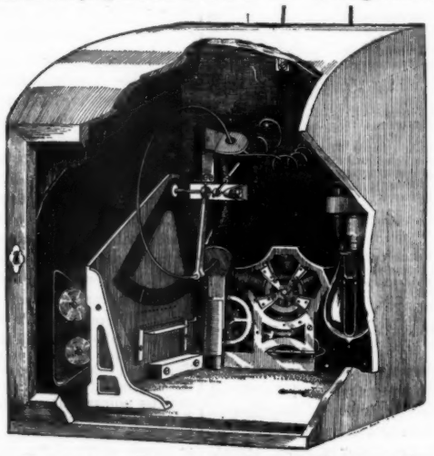


FIG. 1.—VIEW OF THE INTERIOR OF WALKER ELECTRIC METER.

The Shallenberger Meter in Demand.

The Westinghouse Electric Company has recently received an order for 750 Shallenberger meters of various sizes, which is the largest single order for these instruments which has come to the company since it placed the meters upon the market. The order comes from across the Atlantic, having been placed by the Metropolitan Electric Supply Company, of London, England, which, several months ago, decided to adopt the Westinghouse alternating current system for use in its large central stations in the great metropolis. Shortly after getting its first machinery started, the London company made a trial of the meters, and being satisfied with the result, immediately ordered 350 of them. It has now seen fit to supplement the capacity of these 350 by an additional 750 meters, and when the latter order is received at London and put in use, 1,100 meters of the Westinghouse manufacture will be employed there. The Westinghouse Electric Company is naturally more than a little pleased at this evidence of appreciation for their machinery on the part of the English company. The Metropolitan Electric Supply Company, by the way, first ordered 10,000 lights capacity in dynamos from the Westinghouse Company, and about the first of February last placed a second order, for the purpose of increasing its capacity to 25,000 sixteen candle-power lamps. This company's station was visited by a representative of the REVIEW, a few months ago, and found to be thoroughly well equipped and evidently managed by progressive electric light men of London.

Struck Twice by Lightning.

The fallacy of the old saying that lightning does not strike twice in the same place was shown during the recent terrific thunder storm, when the chimney of the Clark Thread Works, in Kearny, N. J., was struck twice within half an hour. It was the monumental chimney which the Clarks built in 1888, and which is the tallest in America. Several church steeples in this city were also damaged by lightning.

Chattanooga, Tenn.—Ridgedale Light and Power Company.

Logan, Ohio.—Logan Electric Light Company; capital stock, $15,000.

Lancaster, Pa.—A charter has been granted to the Lancaster and Lititz Electric Railway. The capital is $50,000.

East St. Louis, Mo.—Two stock companies, having headquarters in East St. Louis, have been formed for the purpose of lighting Mexican cities with electricity. One is the Durango Electric Light Company, which purposes to light the city of Durango, Mex. Its capital stock is placed at $150,000, in 1,500 shares. The other is the Agnas-Calientas Electric Light Company; to light the city of Agnas-Calientas, Mex. Its capital is $150,000, also in 1,500 shares. Theodore Plate, John Plate and Albert Shenk, are the incorporators of both companies and hold all the stock.

Independence, Mo.—Citizen's Electric Light Company; capital, $25,000.

Opelika, Ala.—Opelika Electric Light and Power Company; capital, $5,000.

Kansas City, Mo.—The Phonographic Cash Register Company; capital, $25,000.

Bridgeport, O.—Bridgeport Electric Light and Power Company; capital stock, $20,000.

South Framingham, Mass.—The Framingham Street Railway Company; capital, $30,000. Will use electricity.

Highland Park, Ill.—Highland Park Electric Light Company; to furnish light, heat and power; capital stock, $25,000.

Garrett, Ind.—Garrett Electric Light Co.; with a capital stock of $10,000, and F. W. Brandt, F. E. Davenport and W. H. McIntyre, as directors.

Tomahawk, Wis.—Electric Light and Water Company; with a capital of $25,000. The incorporators are, W. H. Bradley, Milo Woodbury and Fred. H. Miller.

Goshen, Ill.—Citizens' Electric Company; capital stock, $3,000, in $15 shares; directors, Albert Gates, A. J. Irwin, O. M. Carter, Woodson Messick and H. Dembufsky.

Morrison, Ill.—The Morrison Electric Light Company; to furnish light, heat and power; capital, $25,000. Incorporators, E. A. Smith, O. H. Brown and G. H. Brown.

Chicago, Ill.—Caloric Light and Fuel Company; to do a general lighting and heating business; capital stock, $150,000; incorporators, M. Goldsmith, H. G. Coffee, J. L. Kerr.

Chicago, Ill.—Consolidated Wire Company; to do a general manufacturing business in wire; capital stock, $1,000,000; incorporators, W. G. Stoddard, W. H. Waters and E. A. Rice.

Chicago, Ill.—American Electric Supply Company; to manufacture all kinds of electric apparatus; capital stock, $250,000; incorporators, F. E. Shaw, William Martin, W. O. Johnson.

Norwood, N. Y.—Norwood Electric Company; capital, $10,000. The trustees are: Geo. W. Richards, Sidney R. Phelps, Wm. D. Fuller, Fred R. Smith, Loring R. Ashley, Thos. C. Frenyear, Norman M. Claflin, E. F. Hall and Geo. Harris.

McKeesport, Penn.—A charter has been granted to the Sun Illuminating Company; capital, $5,000. The directors are J. B. Griggs, of Allegheny, W. M. Cooper, of McKeesport, James M. King, of Edgewood, and H. L. Trus and J. H. Young, of Pittsburgh.

Logansport, Ind.—The Pullman Electric Motor Company was incorporated last week, with a capital stock of $25,000, in $50 shares. The directors are: Alexander R. Shroyer, Mathew E. Campion, Harrison B. Beymer, Edward N. Talbott, John Gray, James E. Parker and John F. Johnson.

Norfolk, Va.—Citizen's Light, Heat and Power Company. The following officers have been elected: R. M. Stuart Wortley, of England, president; W. V. H. Williams, of Portsmouth, secretary and treasurer; L. R. Watts, George L. Neville, O. V. Smith and A. D. Bateman, board of directors.

Baltimore, Md.—Wenstrom Consolidated Dynamo and Motor Company; for manufacturing and selling electric dynamos and motors, electric appliance for street railways, electric lamps, etc. The capital stock is placed at $1,000,000, and the incorporators named are: Messrs. Enoch Pratt, Robert Rennert, F. Latrobe and Gov. E. E. Jackson, of Maryland; Edwin L. Tunis, ex-Gov. James B. Groome and D. D. Mallory, who are also named as a board of directors for the first year.

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The Massachusetts Society is to utilize the phonograph in preserving the language of the Passamaquoddy Indians. Anything to preserve Mr. Lo and his language and customs for the benefit of our children. While we in the East are preserving his language in a phonograph, the post-traders in the West are doing their best to preserve his body in alcohol.

And now the time has come when the spring poet and the spring liar skip joyously together, hand in hand, through the realms of imagination. Here is the liar's first effort: "An Athens, Ga., 14-year-old boy has accomplished that which, doubtless, no boy of his age has ever done before. He has made a complete dynamo, capable of lighting one large arc light, run by a treadle. He has made a complete telephone, and has made a great improvement in the transmitter, which is said by electricians to work perfectly and be much simpler than the one now in use."

A short time since, Mr. Everett W. Burdett appeared before the committee on manufactures, of the Massachusetts Legislature, as attorney for the Massachusetts Electric Lighting Association, to protest against the passage of a bill to enable cities and towns to own municipal electric light plants. Mr. Burdett's argument was brilliant and interesting. His first point was that there was no public demand for the proposed legislation, and later he claimed that the apostles of nationalism were striving for the passage of the bill so as to put into practice the theories of Bellamy and Ely. The speaker insisted in his summing up that such a measure, if it became a law, would be contrary to sound precedent, and in violation of all our theories of government.

Such of our readers as were present at the Electric Club on February 20th, 1890, and heard Mr. Grosvenor P. Lowry's able paper on "Patent Law and What Constitutes an Invention," will remember that he mentioned a case which was pending in the Supreme Court, which related to the construction of Section 4887 of the Patent Statutes, and in which the question involved was whether the failure to observe any of the conditions subsequent, provided in the foreign patent laws, would cause the practical expiration of an American patent for the same invention, granted subsequent to the date of the foreign patent. A decision of the Supreme Court on the subject has now been reached, and the law is very tersely stated in a communication which we have received from Dr. G. H. Benjamin, and which appears in another column.

Mayor Grant has received a communication from Mr. W. L. Booker, the British consul-general at New York, calling his attention to the International Exhibition to be held at Jamaica, in 1891. A large appropriation of space has been reserved for American exhibits, in sympathy with the important trade between the United States and the West Indies. No charge will be made for space in the exhibition building, and no duties will be levied on exhibits unless they are sold on the island. We gladly take the opportunity of bringing the proposed exhibition to the notice of electrical manufacturers, and trust that the electrical industries will be well represented. There is little doubt that a good showing of instruments, bells, wires, lighting apparatus *et hoc genus omne*, would result in a great increase of trade in electrical appliances between this country and the West Indies.

A steel twin-screw steamer, appropriately named the "Relay," has lately been built and equiped in England for the Central and South American Telegraph Company. The "Relay" is 240 feet long, 32 feet, two inches broad, and has 24 feet depth of hold. She is provided with three cable tanks and a complete set of paying out and picking up machinery for laying and repairing submarine cables, steam sounding machine, and all the latest improvements. Last month the "Relay" made her official trial trip at sea, all working satisfactorily, and she will shortly proceed to the west coast of South America, where she will be engaged in looking after the Central and South American Telegraph Company's cables, which stretch from Lima, Peru, to Mexico, touching at various points in Peru, Ecuador, Columbia, Nicaragua and Guatemala. At present there is only one steamer on the west coast to keep in repair nearly 5,000 miles of cable, comprising 15 different sections.

TWO GOOD SUGGESTIONS.

There is a proposition before Congress to pay the two daughters of the late Professor Joseph Henry $20,000 as part compensation for their father's 25 years' service as a member of the Light House Board. Professor Henry spent his life in earnest work, making many discoveries in science, and valuable improvements in the useful arts, for which he asked no compensation, and did not always receive due credit. If he had patented and sold his inventions, he would have made a fortune; if he had been a soldier, he would have been pensioned long ago; as a scientist, he has received a monument. A number of scientific gentlemen particularly interested in electrical matters are discussing the question of giving the names of Henry and Franklin, and, perhaps, some other Americans, to the electrical units which have not yet been definitely named. The subject will be brought before the American Meteorological Society, which will hold a meeting at the Columbian University, in Washington, on the 21st and 22d of April, by Professor Mendenhall, superintendent of the Coast Survey, who will deliver an address on electrical units. The Professor hopes that the electrical organizations will take an active interest in the matter, and give their aid towards the accomplishment of this very desirable object. While European countries are generally represented in the naming of the electrical units, the United States has never been recognized, and it is quite time that this apparent partiality should be corrected.

CHEATING THE DYNAMO.

Henceforth, when, by suicide or otherwise, a condemned murderer succeeds in preventing the carrying out of his death sentence, paragraphers must abandon the well-worn headline, "Cheating the Gallows," in favor of one which describes with greater scientific accuracy the act of one who escapes the legal electric death. Who will be the first one to cheat the dynamo? Can the dynamo be cheated, and if so, how? These are questions interesting alike to the sheriff and his victim. A deputy can tie a hangman's knot, but can he make an electrical connection? The hangman can readily inspect the strands of his rope, but can he see the volts in the death current?

It would be well for any unfortunate about to be interpolated in the circuit of the shrieval dynamo to consult an electrical expert. He will get some information which may save his life. A good electrician would recommend a coat of invisible varnish applied to the body. A person thus protected would be as invulnerable as Achilles. Hair oil, being a good insulator, if freely applied to the head, would go far towards keeping the current out of the brain.

The general use of hair oil does not receive aesthetic sanction, but as part of an ante-mortem, or rather, anti-mortem, toilet, it would certainly be in good form. An inventor, of this city, has devised an apparatus to be worn under the clothing by means of which the most powerful currents are rendered harmless. A close fitting undershirt of tinsel would protect its wearer against any current which might attack the body. The thick, tough-skinned palms of the horny-fisted son of toil are proof against almost any current short of a stroke of lightning, and a bare footed street Arab could safely walk on electric wires which would paralyze less calloused soles. An incident has recently been reported which is of the deepest significance. A lad who was apparently dead from contact with an electric wire, was restored to consciousness by being touched with the wire again, in the excitement attending his removal. This would be, if true, a remarkable instance of like curing like, and also shows a possible way of defeating the ends of justice.

It is clearly apparent that the conditions necessary for electrical killing are affected by obscure and unthought-of causes, and while it is not likely that a criminal could completely protect himself against electric currents, he may present himself for the death chair, either accidentally or otherwise, in such an electrical condition that electrical execution will become electrical torture. No one can say what will be the effect of an electric current on a subject worked up to the highest degree of nervous excitement. What physician has not given, with safety, to a patient suffering intense pain, a dose of morphine, which would be sure death under normal conditions?

In view of all the arguments that can be brought against electrical killing, it is clearly in the interest of humanity and science that such an inhuman law should be blotted from our statute books.

A RIVAL TO ELECTRIC TRACTION.

Electric traction engineers in England are finding a rival to their systems in a new method of driving street cars recently tried at Chester. This is a low pressure compressed air system, which Prof. Unwin, F.R.S., pronounces, after a series of experiments, as being practical and less costly than horse traction.

In this system the air is compressed to 170 lbs. per square inch at a station, and is delivered in tubes laid at long intervals alongside the track, just below the roadway. A supply of air is picked up along the route by the car, as a fresh charge becomes necessary, and is stored in a receiver. The operation of charging is simple, and only occupies a few seconds, being performed automatically throughout. The car is started by admitting air into the motor, which is a Rigg's four cylinder engine.

Electrical engineers engaged in traction work will be interested to learn that there is a rival in the field other than the cable, but, like ourselves, they will be inclined to lay heavy odds on electricity as the ultimate winner of the race for supremacy on the field of rapid transit.

CORRESPONDENCE.

Electrical Happenings in Boston, Chicago, Washington, St. Louis.

OUR BOSTON LETTER.

Henry R. Worthington's New England department—through Manager J. B. Betton—has furnished the Blue Hill Electric Light Station, Canton, Mass., with a Worthington independent condenser and feed pump.

Mr. Dustin Killicut for several years an Electrical Inspector for the Boston Fire Underwriters' Union, resigned April 1, to accept a position with the Simplex Electrical Company, of this city. Congratulations on both sides are in order.

Wellesley, Mass., through its selectmen, has obtained permission from the Legislature to construct an electric light station and maintain a system of electric lighting. Mr. P. C. Livermore, of the above named town, is one of the most active of the promoters of the proposed enterprise.

Increase of Stock.—A dispatch to the Boston *Globe*, under date of April 4th, reads as follows: At the special meeting of the stockholders of the Thomson-Houston Electric Company, at Middletown, Conn., to-day (Saturday), more than two-thirds of its capital stock was represented. The object of the meeting was to decide whether the stockholders would vote to increase its common capital stock by 120,000 shares, the par value of which is $3,000,000. The vote upon the increase was unanimous. The capital stock of the company as now authorized by its stockholders is as follows:

Common stock (issued)	$4,500,000
Common stock (authorized at this meeting)	3,000,000
Preferred stock (issue of July 1, 1889)	1,000,000
Preferred stock (authorized Dec. 18, 1889)	3,000,000
Total	$11,500,000

The Schaefer Electric Manufacturing Company, of this city, will have its new "high voltage" incandescent lamp ready within a fortnight. President Leopold Schlegelmilch reports Schaefer lamp business as active, and prospects for a healthy Spring business very encouraging.

The Russell Electric Lamp Company, of this city, regarding which announcement was made in our last week's number, has several of its new arc lamps on exhibition at No. 85 Water street.

New Cut-out Rosette.—Messrs. H. E. Swift & Company, manufacturing electricians, this city, have about ready for the trade a new cut-out rosette, possessing novel features, among which are its waterproof and fireproof cap and base.

New Journal Bearing.—The anti-friction roll journal bearing, manufactured by the Tripp Manufacturing Company, of this city, is being sold in large quantities among electric car manufacturing companies in this country and abroad. This bearing is constructed on a new principle by which the axis of the rolls are kept in line with the axis of the shaft. The journal boxes are dust proof, and, it is claimed, that one lubrication will answer for one year's constant service.

A Compound Engine Heater (new type), of 200 horse-power, manufactured by the Wainwright Manufacturing Company, of this city, has been added to the steam plant equipment of the Blue Hill Electric Light Company, at Canton, Mass. Another heater of 400 horse-power (same type and make), has been furnished the power station of the Wilmington City Electric Railway Company, Wilmington, Del.

The Blue Hill Electric Light Company's new station at Canton, Mass., is finished and its dynamo and power machines and steam plant equipment in position and ready to start up. The Westinghouse system will be used—consisting at present of 750 incandescent (alternating) lights and 35 Waterhouse arc lights. Orders are already in hand which take the entire arc light capacity of the station. These include commercial as well as the street lights. The station was erected and the equipment installed under the direct supervision of Mr. F. E. Alexander, district (New England) engineer of the Westinghouse Electric Company.

Waltham, Mass.—Because of increasing business, the electric company will install a new 300 horse-power engine and machinery sufficient to furnish power for 2,500 incandescent and 300 arc lights, and to construct an addition to their power house of 62 feet in length.

Concord, N. H.—The mayor and aldermen voted last week—7 to 5—in favor of allowing the directors of the horse railway to use electricity on their cars, and to select the system they choose. This vote reverses the former action of the board, and is a victory for the horse railway, whose officers introduced the single trolley system. After the adoption of this vote, a notice was filed by the New England Telegraph & Telephone Company, that it would hold the city responsible for all damage to its plant, caused by the use of the single trolley system.

Proctor, Vt.—The Vermont Marble Company's mills will be served with electricity for lighting purposes. It will be necessary to build a station for the dynamos and other apparatus. Arc lamps will be used to illuminate the quarries, yards and large buildings, while incandescent lights to about the number of 500 will be used in the mills and other buildings. The Thomson-Houston Electric Light Company has the contract for the work.

Electric Light and Gas Consolidation.—The Methuen Gas Light Company, Methuen, Mass., has purchased a 750 alternating light machine and a 35 arc light, both of the Westinghouse system.

Electric Railway for Woonsocket, R I.—Directors of the Woonsocket Street Railway Company have voted to equip their road with Thomson-Houston electric motors and overhead trolley system.

The Electric Light Companies of Woburn and Somerville, Mass., report increase in lighting capacity of their respective stations. The business of both companies (commercial and street lighting) show a healthy growth; and they are easily paying six per cent. out of their net income.

New England Electric Company, of this city, agents of the Sprague Electric Railway and Motor Company, has installed in Boston very recently, Sprague electric motors as follows: Two horse-power at A. E. Rowe's machine shop; ten horse-power at Brooks' Bank Note and Lithograph Company; and 20 horse-power operating two elevators at Nos. 38 and 42 Lincoln street; also, 25 horse-power running machinery at H. M. Kingman's shoe factory, Brockton, Mass.

Electric Cars for Concord, N. H.—At a meeting of the Concord aldermen, on Tuesday evening, March 11, it was voted to grant the Concord Railway Company the right to use electricity for the propulsion of its cars. The single trolley wire system will be used.

Electric Cars for Waltham, Mass.—On Monday evening, March 24, the committee on streets of the Waltham Board of Aldermen recommended that the Newton Street Railway Company be allowed to use electricity as a motive power on the cars used between and in the towns named.

Limiting Electric Car Speed.—At the meeting of the Boston Board of Aldermen, last Monday, the committee of the whole reported the following, which was adopted: No person having the control of the speed of a street railway car shall allow the same to go in the city streets at a speed greater than seven miles an hour, nor in the suburbs at a rate of speed greater than 12 miles an hour, nor shall he allow such car, in turning a corner, to go faster than four miles an hour.

Telephone Service to be Improved.—The directors of the Southern New England Telephone Company, at their recent meeting, in New Haven, Conn., adopted plans for a proposed new building in that city, which will cost about $20,000. For some time past there has been considerable complaint made about the poorness of the telephone service, which was caused mainly by induction. At the meeting, it was voted to lay about 10 miles of subways in Hartford, Conn., to carry the wires underground. In order to do this, the company will be obliged to go to an expense of about $35,000.

Tropical American Telephone Company.—Business has increased so rapidly with this company since the first of the year, that it has become necessary to employ several additional assistants at the company's home office in this city; and also add to the force of its several branches, respectively. Hereafter the company will carry stocks of telephone goods in four different cities on the Atlantic seaboard, from which steamers connect between them, respectively, and ports in South America and Central America, thus facilitating promptness in filling export orders. The company is about to issue a pamphlet which will contain a description of its telephonic rights in the territory it controls.

Storage Batteries for Street Car Service.—Col. E. H. Hewins, manager Union Electric Car Company, this city, read a paper "On the Application of Storage Batteries to Street Car Propulsion," at a well-attended meeting of the Society of Arts, held at the Institute of Technology, Boston, Thursday evening, March 27.

Electric Stocks.—Boston quotations at closing hour of the Exchange, Saturday, April 5, were as follows:

Thomson-Houston Electric Company	58¾
" " " " Preferred	25⅞
" " " " Series C	16⅛
" " " " Series D	7⅛
Thomson Electric Welding Co	230.
" European Welding Co	118.
Westinghouse Electric Co	45.
Fort Wayne Electric Co	15.
Edison Phonograph Doll Co	6¼
TELEPHONE:	
American Bell	218.
Erie	39¾
New England	49⅛
Mexican	.80
Tropical American	.50
National Tel. Mfg. Co. (acoustic)	.65
Mass. Pulsion Tel. Co. (acoustic)	2.

Boston, April 5, 1890. W. I. B.

After numerous delays and various troubles, the Brush Electric Company, of Cincinnati, has secured the contract for lighting the city.

OUR CHICAGO LETTER.

W. P. Adams, of the International Thomson-Houston Company, passed through Chicago this week from Mexico *en route* to Boston.

Personal.—Ernest Hoefer left Friday for an extended trip through the South.—Wm. D. MacQueston, New York, was a recent visitor in the city.—H. P. Lucas has severed his connection with Holmes, Booth & Haydens, and has accepted a position as manager of the supply department of the Northwestern Electric Construction and Supply Company, St. Paul, Minn.

Wm. Hood, western representative of the New York Electrical Accumulator Company, closed a contract last week to furnish 120 fifteen-L cells of storage battery for lighting the Turkish baths, laundry and corridors throughout the Palmer House. The cells will be arranged in three series, 40 in each.

The Banks Cregier-Milton Weston Conduit Ordinance was defeated in the council Thursday night last, by a vote of 40 to 19, and the following order adopted unanimously:

Ordered, That the superintendent of the city telegraph send to the city council at its next regular meeting, a full and detailed statement of all wires belonging to or connected with the police and fire alarm telegraph systems, and under his charge by virtue of Section 797 of the municipal code, and he shall also report to the council at the same time all conduits owned, controlled or used by the city for the purpose of carrying its wires, giving the location of each conduit and cost of the same to the city, and also report the number of poles owned by the city upon which said wires are carried and the cost or value of same, and on what streets and alleys said poles are placed, so that the city council may be possessed of full information as to the value of its poles and fire alarm system, as to wires, poles and conduits, and also whether or not the city cannot use its poles and fire alarm systems for the purpose of renting to its citizens poles and fire alarm boxes or calls.

The Thomson-Houston Company report the following sales this week: Illinois Steel Company, Bay View, Wis., 35 arc and 50 incandescent lights; Oakland Gas Light and Heat Company, Oakland, Cal., increase of 35 arc lights; John Kranz, Chicago, 300 incandescent; Laredo Improvement Company, Laredo, Texas, 100 arc and 1,300 alternating incandescent lights (these lights will be used in lighting the city); A. H. Revell & Co., exchange of a gas engine for a 10 horse-power motor; the *Inter-Ocean* building, Chicago, 300 incandescent lights.

J. H. Reid, in addition to his other work, has become the Western representative of the Easton Electric Company, covering all territory West of Ohio. As Western manager of the Mather Electric Company, he reports the following sales: Davidson Theatre, Milwaukee, Wis., 1,600 incandescent and 10 arc; 250 incandescent lights to be used for lighting the new passenger and freight steamer of the Goodrich line, now under construction at Manatowoc, Wis.

April 5, 1890. D. B. D.

OUR WASHINGTON LETTER.

The Lighting of the New Custom House and Post Office Building at Baltimore, Md., promises to be one of the most satisfactory installations yet made under the jurisdiction of Superintendent Powell, of the Treasury Lighting Bureau. The Waterhouse Electric Lighting Company, of Baltimore, secured the contract, in competiton with other leading companies, and, although a very short time was allowed for the work, completed it in time. Mr. Powell and the contractors spent several days and nights in getting the work finished, and the current was turned on only half an hour before the Secretary of the Treasury and the Postmaster-General arrived to inspect the building, no opportunity for testing the wires or lamps having been had. The plant proved to be in good order, and everything worked successfully. Sixteen hundred Thomson Houston 16 candle-power lamps are supplied with the alternating current by the Slattery system. Fort Wayne Jenney Converters are located in a basement room devoted exclusively to the purpose.

Of Course, the Paper Controlling Votes Gets the Patronage.—The work of installing an extensive electric lighting plant in the New York Navy Yard has been postponed. Some months ago the Navy Department awarded a contract for this installation to the Brush Electric Company. The contract was drawn to cover not only the present work, but large extensions to be made in future years. For this work the company's estimate was considered high and the government insisted on a stipulation that it should be at liberty to require its performance at either the contract price or at market rates whenever it should be done. This arrangement the Brush Company did not regard as advantageous to its interests. The department will now prepare a new plan for this yard, which will include electric welding, electric power, etc., and, at some future time, advertise for bids. As the departments' advertising is considered as a species of government patronage, interested parties should study the politics of the United States Navy and those local newspapers that control the most votes.

Commander John S. Newell, the successor of Commander Bradford as superintendent of the Naval Electric Bureau, has arrived at Washington and assumed charge of the work of the office.

A Bill recently introduced in Congress, proposing to charter the Washington and Great Falls Electric Railway Company, stipulates that "the corporation *shall* operate its road by electric power." The route of the road is six miles up the Potomac River from Washington. Capital, $250,000, and Mr. James L. Barbour, of Washington, D. C., is the man to send electric catalogues to. That is all that need be done at present.

Numerous Bills in Congress authorizing the construction of bridges over navigable rivers, contain the provision that "equal privileges in the use of the bridge shall be granted to all telephone and telegraph companies, and the United States shall have the right of way for postal telegraph purposes.' It might be a useful thing to provide for electric light and power wires in the same way.

The Tariff Bill, as agreed upon by a majority of the House Committee on Ways and Means, contains some items of interest to readers of the REVIEW. Among them are the following:

Chromic acid	6	cents per pound.
Bichromate of potash	3	" "
Muriatic acid	¼	cent "
Sulphuric acid	¼	" "
Bichromate and chromate of soda	3	cents "
Sal-ammoniac	½	cent "
Blue vitriol	2	cents "
Quicksilver	10	" "
Lead	2	" "
Zinc, in blocks or pigs	1¾	" "
Copper (now 4c. per pound)	2	" "
Aluminum, manufactured or crude (now on the free list)	35%	ad valorem.
Mica (now on the free list)	35%	"

Iron or steel wire, not smaller than No. 10 wire gauge, 1¼ cents per pound; if galvanized, one-half cent additional. All iron or steel wire valued at more than four cents per pound shall pay a duty of not less than 45 per cent. ad valorem. G. C. M.

Washington, D. C., April 5th.

OUR ST. LOUIS LETTER.

The City is at Last promised electric lights by May 1st. The Wood lamp has been substituted for the Jenney; the boilers and engines at the power house have been tested, and every night some city circuit is turned on for testing purposes. The decision of the Board of Public Improvements in favor of the Wood lamp was somewhat of a surprise to the public. In view of the fact that six months ago this same board had been shown and acquiesced to the superiority of the Jenney over all other lamps, it did not seem probable that they would contradict this opinion. This was done, however, after a severe test was given the Wood lamp, and now nothing impedes the progress of the Municipal Electric Company's work. Mr. Ayer, superintendent of the company, said that about 1,700 lamps would be swung and in use by May 1st. The plant of this company is a very large one, embracing a battery of 20 boilers, and contains eight 500 horse-power engines.

An Injunction was taken out against the Postal Telegraph Company, restraining them from taking any action against the Missouri Electric Light Company's wires, now strung on their poles, until the matter had been looked into. The Missouri Company claim, that by their contract with the city, they can string their wires on any pole, provided they give notice to the owners; this the Postal Company deny. As all the wires for the alley lighting are strung on these poles, it is quite a serious question.

Suburban.—Electric City, Ill.: It is proposed to light this town by electric lights entirely.

Warrensburg, Mo.: The Warrensburg Electric Company, of Johnson County, has filed articles of incorporation. The capital is $25,000. The incorporators are James Christopher, James Eades and Geo. Shaw. The intention is to manufacture, generate and sell electricity for lighting, heating, and as a motive power.

Belleville, Ill.: The Belleville Electric Light and Coal Company filed articles of incorporation. Capital, $70,000. Incorporators, John Brosius, Geo. Knohlock and John Thomas. This company has just bought out the St. Clair Steam Supply and Electric Light Company. W. H. B.

St. Louis, Mo., April 5th.

Col. Henry C. Davis, ex-president of the Electric Club, and Mr. F. E. Pettingell, Boston, well-known electrical men, returned to the United States, Monday, in the "Umbria."

Invitations have been issued by the Brooklyn Edison Electric Illuminating Company, to visit and inspect their new station and show rooms on Pearl street, near Myrtle avenue, on April 8th and 10th.

Mr. Geo. D. Allen, secretary and general manager of the Excelsior Electric Light Company, died on March 28th, at his home in Brooklyn. Mr. Allen was a gentleman of energy and force, for years identified with electric lighting, and will be missed by a large number of the early workers in the electrical field.

*** The American Bell Telephone Company has begun equity proceedings in the United States Court, at Philadelphia, for injunctions to restrain 27 parties from using telephones alleged to be infringements upon the company's patents.

*** The Assembly committee on electricity, last week, listened to arguments on the Clark telephone charges regulation bill. Frank S. Gardner, James Talcott and Simon Sterne, of New York, counsel for the Telephone Subscribers' Association, of New York city, were present, claiming to represent 5,000 telephone subscribers in New York and Brooklyn. They urged that $80 a year for a telephone would give a fair profit in New York city.

The Telephone in Germany.

The telephone service is admirable, as is testified by the public appreciation, their being over 10,000 instruments in use in Berlin. There are no private telephone companies in Germany, the telephone, like the telegraph, being a branch of the postal service. The price for telephone service is low, the annual charge for an instrument being 120 marks, or something less than $30. The long distance service between the principal cities of the empire is being rapidly introduced. A telegram received for a person who has a telephone is at once delivered orally from the central office, and the written message then forwarded by the local post. Likewise a telegram is transmitted by the sender to the telegraph office by telephone. The telephones in use are manufactured by Siemens & Halske, the electricians.

A Novel Wire for Telephone Service.

The principal office of the Simplex Electrical Company, in the Hathaway Building, this city, has private telephonic connection with an office at No. 122 Milk street. This line consists of two insulated wires (one of iron and the other of copper) entwined about each other yet perfectly separated by an insulated cord, thus preventing a short circuit. These wires pass through an enormous number of electric light cables and wires (side by side with them on poles and structures) for a distance of three-quarters of a mile; and at the terminals is an ordinary Bell telephone instrument.

By request recently of Col. A. F. Mason, the company's general manager, I called up the Milk street office referred to, and, for several minutes, carried on a conversation in low tone of voice, or whisper, with a gentleman at other end of the line. Some of my questions and replies were made with my back to the telephone instrument, and again, when standing several feet distant from the transmitter. Every word, in low tone or whisper, uttered near the instrument at No. 122 Milk street, came clearly and distinctly over the line; and to my great surprise, not the slightest induction was perceptible.

Apropos to the discussion following the reading of Mr. W. J. Denver's paper before the Boston Electric Club, Monday evening, March 24. Col. A. F. Mason, stated: "That the Simplex Electrical Company is prepared to construct telephone lines under the most difficult conditions, as related to induction, that can be found; and to guarantee that the lines shall be entirely free from any disturbances by induction, and be as silent as the grave." This company, as is a well-known fact, is amply responsible and fully able to carry out any contract it may make. W. I. B.

Boston, Mass., March 29.

How it Feels to be Hanged.

A correspondent of the New York *Sun* writes as follows:

"The plea for execution by electricity, I believe, is its painlessness. Hanging is equally painless and certain. Some years ago in France many criminals were sent to the South, where, in a desolate, rocky country, they were employed daily in the open air, barefooted, imperfectly clothed and badly fed. The suffering was fearful.

"The men condemned to this lot were confined for a time in the Conciergerie at Paris. From time to time a gang would be sent off. The sufferings of those that were sent to the South were soon known to their comrades in Paris, and an epidemic of suicide broke out in the Conciergerie. The convict would fasten the leg or some part of his garment around his throat. A bone from his meals, or some similar object, would be driven firmly into the crevices of the wall as high as he could reach and then, a noose being made, rising on his toes he would fasten it to the bone. Lifting his feet he was soon lifeless. In the convulsion which occurred previous to death he would kick vigorously on the walls, producing some noise. After several suicides had thus occurred, the guards became more careful. On hearing the kicking, the guard would rush to the door, unlock it, and cut down the suicide. A number of these were resuscitated, and when questioned all said that their only sensations were a feeling of lightness, as if floating in ether; no pain, a ringing in the ears, and insensibility.

"Twice I have been nearly asphyxiated. Once when a boy, before I could swim. Bathing in the East River somewhere near what is now the foot of Delancey street, while venturing a little too far I stepped into a hole. Immediately the feeling of buoyancy, the flash of light, the ringing in the ears, occurred. I made mechanically a step or two and was out of the hole and of danger. The second time occurred after I was of mature age. I was eating a biscuit, when, from some surprise, I drew a quick breath, and drew some crumbs into the larynx. The same sensations followed, but I coughed and got rid of my strangulation."

A Modern Telephone Exhibit.

The American Telephone and Telegraph Company (long distance) and the Metropolitan Telephone and Telegraph Company, of this city, have united with the Edison Company in the electrical exhibit at the Lenox Lyceum, which was opened this week in this city. This is probably the most comprehensive and interesting modern telephone exhibit. No similar telephone exhibit, we believe, has ever been made, in fact, it is only within the last year or two that it has been possible to make such a showing of the excellency of this wonderful instrument for transmitting speech long distances.

In the Lenox Building, Fifty-ninth street and Madison avenue, 100 sets of telephones have been placed and are connected with the Broadway Theatre and the Casino, where comic operas are being performed, so that all who desire may hear the music at each performance while seated in the exhibit building.

The loud telephone, specially adapted to take music and transmit it, has been partitioned off, and by this means, persons sitting in this parlor may hear words and music from a distance, without placing the receiver to their ears. A monologue and music from Boston will also be heard over the long distance lines.

A large portion of the Paris telephone exhibit will be on exhibition here. A number of booths have been fitted up, and visitors will have the privilege of talking to any of the cities in the system for a small charge, the proceeds of which will go to the benefit of the objects of the Lyceum.

It is a remarkable fact, if true, and it is very probable, that, although it is known there are over 100,000 telephone talks a day in the city of New York, there are probably a million people living in this city who have never yet talked over a telephone. At first blush this would seem impossible, but as there are only 8,000 telephones in use in the city, it is the opinion of a number of practical and observing men in the telephone business that the above statement is a true one. A person who has never talked over a telephone has undoubtedly missed an experience. Just what that experience is depends somewhat on the telephone and a good deal on the speaker, as well as the listener at the other end of the line. The telephone instrument has had to bear a great many of the gibes and witticisms of the witty writers of the day, yet the wonderful success that has grown out of this delicate apparatus and gentle, undulatory electric current, is one of the wonders of the age.

The person who, for the first time (having been accustomed to the use of local telephony service), uses the improved long distance instrument is filled with astonishment and gratitude. Long distance telephony is pronounced and growing success, and its future no man can to-day predict.

Gladstone from the Phonograph.

THE BRITISHERS WILL HEAR TECUMSEH SHERMAN'S VOICE.

A few days since, an audience of Americans listened to the voice of William Ewart Gladstone, in the Equitable Building, on Broadway.

The occasion of the gathering was the delayed arrival from England of a phonographic message from Mr. Gladstone, addressed to the American co operative building and loan associations, which was intended for use at the public meeting in the Cooper Union, on the 14th. Colonel Gouraud, chairman of the reception committee, invited a committee of gentlemen to meet at the Lawyers' Club one afternoon to listen to this message.

About 150 gentlemen were present in the Law Library, half of whom were delegates from various building fund associations. Colonel Gouraud explained to the audience that a letter was sent to Mr. Gladstone about six weeks ago requesting him to send a phonographic communication to the loan associations. On the afternoon of the 7th of March, Mr. Gladstone called at Colonel Gouraud's residence, Wessex House, London, and dictated to a phonograph the message which was to be reproduced. Colonel Gouraud introduced as chairman of the meeting to receive the words of the Grand Old Man of England, General Sherman, the Grand Old Man of America.

General Sherman said that the audience assembled was worthy of listening to the British statesman, and then he called upon Mr. Gladstone to speak up.

The phonograph was placed upon the table, Colonel Gouraud took from a box the carefully packed cylinder which bore the impress of Gladstone's voice. He explained that the cylinder had been tested but once since its arrival in this country, and had been found to be in perfect condition. Handing it to General Sherman, Colonel Gouraud said:

"General, here is Mr. Gladstone; don't drop him."

"I'll hold him with both hands, as well as in my heart," was the veteran's reply, and he tenderly took the black cylinder.

Mr. Wangemann, of Edison's laboratory, adjusted the cylinder in the phonograph, attached a speaking trumpet or big cone to throw out the sound, and while the audience kept perfect silence the apparatus was put in motion.

After the message had been repeated once, three pairs of rubber ear-pieces were attached to the machine, and General Sherman, General Porter and British Consul-General Booker, listened to a repetition of it by means of these aids. They said they heard it with great distinctness and that all the modulations and individual characteristics of the voice were faithfully reproduced. Consul Booker, who is familiar with Mr. Gladstone's voice, said the production was perfect. This is the message as the gentlemen heard it:

"The purpose of the meeting on the 14th may, I conceive, be summed up in two words—self help and thrift—and I cannot, although much occupied, refuse to send to it a few words of congratulation and good will. It is self-help that makes the man, and man making is the aim which the Almighty has everywhere impressed upon creation. It is thrift by which self-help for the masses, dependant upon labor, is principally made effective. For them thrift is the symbol and the instrument of independence and of liberty, indispensable conditions of all permanent human good. But thrift is also the mother of wealth, and here comes a danger into view, for wealth is the mother of temptation, and leads many of its possessors into a new form of slavery, more subtle and not less debasing than the old. From this slavery may all lands, and especially all lands of the English tongue, hold themselves forever free."

President Frederic R. Coudert, of the Bar Association, submitted a series of resolutions which the meeting requested General Sherman to speak into the phonograph and send back to Mr. Gladstone.

Mr. Thurber's Reasons for a Postal Telegraph System.

The following is an abstract of a very strong argument made before the Post Office Committee, by Mr. F. B. Thurber, of New York:

In the testimony of Dr. Green, the president of the Western Union Telegraph Company, he stated: "There is nobody who patronizes the telegraph asking for a postal telegraph," and I wish to rebut that statement by showing what the sentiment upon this subject really is among business men generally.

The argument that but a small part of our population now use the telegraph, is no argument at all. When the postage on letters was high, but few people wrote letters; but with the cheapening of postage to an extent which could never have been ventured upon by a private corporation, the use of the post office became almost universal, and the same result would follow from the government establishing a real postal telegraph, with reasonable tolls. In stating how few persons use the telegraph, the opponents of a postal telegraph furnish the strongest argument in favor of one.

The United States is the only country on the face of the globe of any importance where this most important means of transmitting intelligence is not owned and operated by the postal department, and it seems an anomaly that the most progressive nation on the face of the earth should be the most unprogressive in this respect.

It can only be explained by the fact that certain farsighted private individuals saw its great value when used as a machinery in private hands to tax the public, and the master minds in the great corporation which now controls the telegraph business of the United States, have steadily associated with them the most influential men in the financial and political worlds. The list of names in the board of directors of the Western Union Telegraph Company is, to-day, an answer why the public cannot have the great boon of a postal telegraph given them. They are the men who control the great railway corporations of the country, and the controlling influence over national legislation, which these great organizations exercise, is well known.

No such list of names can be found in the direction of any other corporation in this country. Every name represents some great interest. They are the richest and best in the financial world. They rank as our best citizens; their names are found scattered throughout the religious and charitable world, but in the matter of transmitting intelligence, their interest diverges from that of the general public, and it remains to be seen whether 65,000,000 of people, or the comparatively few stockholders which these men represent, will be able to control the great force of electricity as applied to the transmission of intelligence.

They are entitled to just treatment. Their property should not be taken or depreciated without giving a fair equivalent; but I believe that the welfare of this country will be subserved by the people controlling the development of this great power for good or evil.

PERSONAL.

Sanford S. Small has begun an action against the Minneapolis and American Electro-Matrix Companies, for what he thinks is an attempt to freeze him out. Some very prominent men are included among the defendants, and hot times may be expected during the trial.

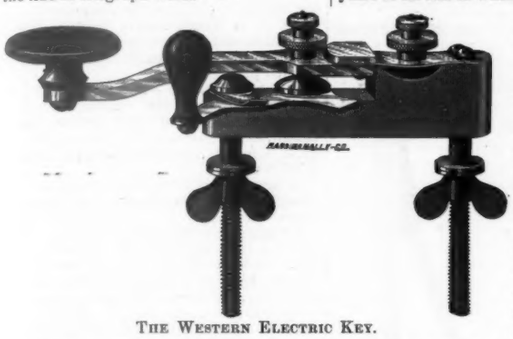
Col. Gardiner C. Sims was a New York visitor last week, on his return from Virginia, where he had organized a railway company. The Colonel is deserving of the success he has won in engineering and financial circles, and his New York friends will be pleased to hear that he occasionally builds a railroad as a side issue to keep him busy.

Mr. H. H. Crowell, who formerly represented the Thomson-Houston Motor Company, in Lynn, Mass., has recently assumed charge of the Syracuse office of the motor company for the agency of stationary motors, mill tramways and elevator work. Mr. Crowell has been very successful in Lynn, and, without doubt, will be fully as successful in his new field of labor.

Mr. Fred. W. Royce, the restless and always ingenious inventor, of Washington, is reported as having again returned to his first love, and is devoting his days and nights to the problem of cooking by electricity. The large number of friends that Mr. Royce has in all parts of the country will wish him the fullest success, and when he, with his epicurean taste, announces that the electrical cooking apparatus is perfect, no one will doubt it. The REVIEW is pleased to note this evidence of enterprise and persistency on the part of Mr. Royce, and wishes him well-rounded success.

The Fast Telegraphing Tournament.

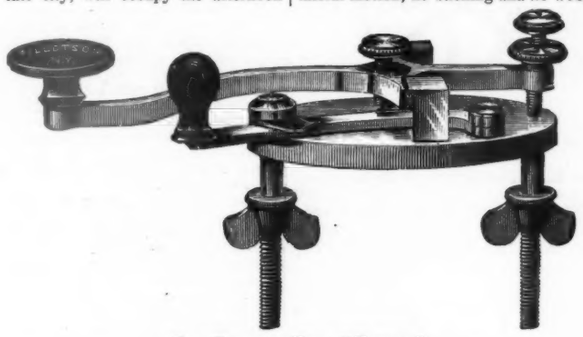
The contest of telegraph operators, which occurs in this city, this week, for the supremacy of fast sending and also for accurate and clean receiving, will undoubtedly result in a general improvement along the line of telegraph work.



THE WESTERN ELECTRIC KEY.

Mr. Fred. Catlin, of the Western Union, is the manager of the tournament, and is entered in the old-timers' class, and it is quite freely predicted that he will carry off the honors.

The contest, which occurs at Hardman Hall, this city, will occupy the afternoon and evening of Thursday, and from the evident interest it has attracted will be largely attended. The manufacturers of telegraph keys and sounders very naturally take quite an interest in the tournament, and many of them have contributed to the prize fund.



THE GREELEY KEY—"VICTOR."

We present below illustrations and descriptions of several of the keys which will be used on the occasion of the tournament, and shall announce the names of the winners of the contest in these columns next week.

THE "VICTOR" KEY.

This cut shows the "Victor" telegraph key manufactured by The E. S. Greeley & Company. This is the instrument on which the fastest time in the world has been made. At the tournament held in this city on April 5, 1885, 500 words were sent in 10 minutes and 32 seconds.

There are only two points of adjustment, the tension spring and the "play." There are no trunnion screws and no trunnions. The bearing is knife-edge and everlasting. The tension spring is also an automatic "take up" of all wear, so that there is no lost motion, and the key works as true after years of service as when new. The contact points are self-centering; they cannot be thrown out of plumb, and consequently never chew off at the edges, which fault is a prolific cause of sticking in trunnion keys. The action is firm as a rock, without a lateral tremor or shake, while the up and down motion is absolutely without stiffness, but as free and light as clock-work.

THE WESTERN ELECTRIC KEY.

This key is one of the Western Electric Company's productions. It is beautifully made, occupies very little space, and has but one adjustment. There is absolutely no lateral motion, no sticking and no wobbling about. The heavy piece of the steel spring, shown on top at the back, protects the thinner part from too heavy or sudden strain.

THE NEW HAVEN CLOCK COMPANY'S KEY AND SOUNDER.

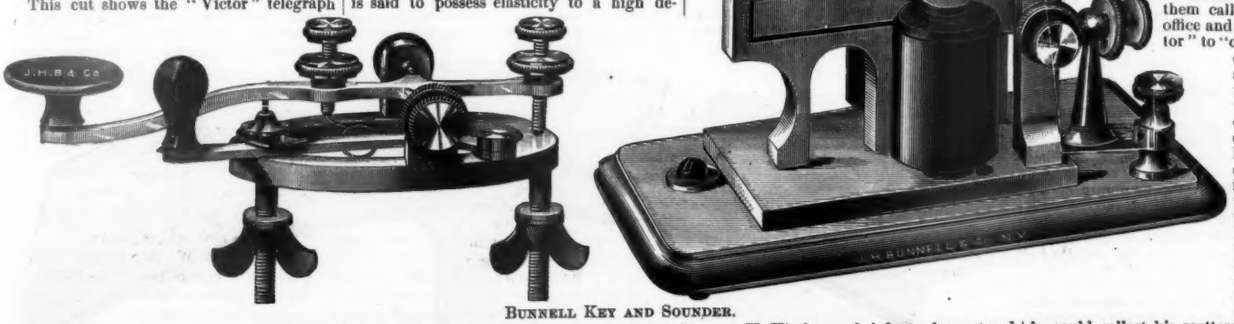
The electrical department of the New Haven Clock Company makes the key and sounder shown in the above cuts. The sounder follows the general construction adopted by most manufacturers. A feature of the key is that the lever is made of malleable iron drop-forged. This material is said to possess elasticity to a high degree, besides being hard to bend or break.

NEW HAVEN CLOCK COMPANY'S KEY AND SOUNDER.

It was only at the last moment that this company was able to be represented at the tournament, on account of the re-organization of the electrical department of the company.

BUNNELL'S KEY AND SOUNDER.

The "giant" sounder and steel lever solid trunnion key, manufactured by J. H. Bunnell and Company, are shown in the accompanying illustrations. These instruments are the latest design sent out by this firm and are recognized as standards of excellence, combining lightness of construction with durability. The key is fitted with hardened platina points so that sticking is impossible. The sounder requires a very small amount of local battery.



BUNNELL KEY AND SOUNDER.

A New Orleans Tournament.

The telegraph operators of New Orleans will take part in a trial of speedy telegraphy, on April 20, under the following rules:

Rule 1.—This contest shall be known as the First Southwestern Fast Sending Tournament.

Rule 2.—There will be three classes, to be known as Class A, Class B and Class C.

Rule 3.—Class A, open to all operators in southwest who have an authentic record of at least 35 words per minute. Prize.—Gold medal, suitably inscribed, value $25.

Class B, open to all New Orleans operators with an authentic record of 25 words per minute. Prize.—Silver medal, suitably inscribed.

Class C, open to all New Orleans operators, other than above mentioned. Prize.—Silk umbrella.

Rule 4.—Three judges and one timekeeper, who have been selected on account of their judicial fitness, shall decide who is entitled to respective prizes. In case of a disagreement between the judges the majority shall rule and their decision will be final.

Rule 5.—Five minutes shall be given the contestants to prepare. At the call of "time" the contestant must be ready or forfeit his privilege.

Rule 6.—The first 500 words of the Constitution of these United States shall be the material for transmission.

Rule 7.—Entries open until April 15, 1890.

Chief night operator E. J. Davis, of the Western Union Telegraph Company, is the manager of the First Southwestern Fast Sending Tournament.

TELEGRAPHIC

.... It is claimed, and we believe justly, that to John W. Mackay is due the credit of reducing the rate on cablegrams from 85 cents to 25 cents per word.

.... A pointer as to government telegraph from the *St. James Gazette*: "One Londoner in a hurry to communicate with an other does not send a telegram or run to the telephone; he simply jumps into a cab."

.... The bill granting telegraph companies the right to construct lines of telegraph on all railroads in the State of Washington, was passed by the Senate and House, last week. The bill was in the interest of the Canadian Pacific and Postal Company's systems of telegraph, which connects British Columbia with Washington, Oregon and California.

.... The golden wedding of Dr. Norvin Green, president of the Western Union Telegraph Company, and Martha Anne English, was celebrated by a large gathering of their friends at their residence, in Louisville, one evening last week. They were married there soon after Dr. Green graduated from the University of Louisville Medical School. There were many present from New York and other cities where Dr. Green is known.

Having Fun with a School of Telegraphy.

Two St. Paul telegraphers entered a "School of Telegraphy," and were informed by the "Prof." that he would teach them the mysteries of the art and procure them a job, for the modest sum of $50, in advance; also that they could become proficient enough, in the course of four or five months, to command a salary of from $50 to $75 per month, without the slightest trouble. They appeared to be wonderfully delighted with this very liberal offer, and meekly replied that they could become very good operators in that time, mentally adding that he was the most colossal liar it had ever been their fortune to meet. They promised to meet the "Prof." at 7 o'clock, to close the contract and add two more names to his collection of telegraphic stars, and, incidentally, a $100 bill to his bank account. Bowing themselves out of the "Prof.'s" sanctum, they proceeded to inspect the quarters of the students.

Entering the main operating room, they found it occupied by four rickety tables, four broken chairs, four sets of the poorest kind of telegraph instruments, and four young men who were busily engaged in trying to pass the time away. On the opposite side of a thin partition was the branch office, which was an exact duplicate of the other one, with the addition of a few inches more dirt on the floor, and more broken chairs. Seating himself at one of the instruments, one of them called up the main office and told the "operator" to "copy," and started in at about a 50-words-a-minute gait. The "operator" at the other end seemed to be paralyzed, and grabbed the table as if he thought it was about to rise up and knock him down. He would put down a letter, then grab the sounder, to, as they supposed, hold it until he could collect his scattered thoughts, and endeavor to "copy" the elegant Morse which was being poured into him at a streaked lightning gait. The boys then quietly made their escape, while the "would-be telegraphers" were examining the sounder to see if it had a hot journal or was bewitched. At last accounts the professor was still waiting for the two suckers and the $100.

.... H. Kierbow, of Atlanta, has entered suit against the Western Union Telegraph Company, for failing to deliver a message addressed to him until 15 hours after it had been received at the company's office. The dispatch reached Atlanta March 26, but did not get to Mr. Kierbow till next day. He claims $100 penalty for such neglect under the law.

* * Citizens of the suburban district around Boston are kicking at the seven-mile rate of speed which the Board of Aldermen compelled the electric cars to conform to.

* * The Thomson-Houston International Company has closed a contract with the Bremen Tramway Company, Bremen, Germany, for six motor cars and the equipment of two miles of track.

* * The speed of electric cars in Boston, as fixed by the Board of Aldermen, is not to exceed seven miles an hour to the old city limits, including the railroad bridge over Beacon street, and 12 miles an hour beyond, with a limit in turning corners to four miles an hour.

* * A company has been formed in London under the name of the Argentine Inter-Provincial Railway Company, Limited, with a capital of $6,000,000, gold, for the acquisition, construction, termination, maintenance, prolongation and working of railways, tramways, telegraphs, telephones and other means of communication in the Argentine Republic.

* * The employés of the Citizens' Electric Street Railway Company, of Decatur, Ill., went out on a strike a few days ago. The causes of the strike are long hours, poor pay, and the demand of the company, through the manager, that all employés should supply themselves with uniforms and watches and make a cash deposit as a sort of indemnity fund in case of accidents.

* * The United Electric Railway, of Nashville, Tenn., has filed for registration the official conveyance of the property of the different consolidated roads to the new company, in compliance with the terms of the agreement. The amount for which each company is entered is as follows: McGavock and Mount Vernon, $1,200,000; City Electric, $500,000; Nashville and Edgefield, $680,000, and the South Nashville, $680,000.

The Page Belting Company's Acme Link Belt.

The Page Belting Company are manufacturing a link belt which will doubtless be of great value to all electric light companies. Fig. 1 shows the construction in detail; Fig. 2 illustrates the proper method of using a link belt, the under side being drawn taut, while the upper side is allowed to sag and climb the driven pulley. This brings the belt in contact with a large proportion of its circumference. The Acme belt, when so desired, may be run as in Fig. 3, drawing upon the upper side, the under side being slack. The ever-useful quarter-turn belt is shown in Fig. 4. This belt is especially adapted for this kind of work on account of its extreme flexibility.

Fig. 5 represents (in full size) one of the Acme link belts passing over a pulley 12 inches in diameter, and shows the contact secured by the curved surface given to the under or inner side of the link. Attention is also called to the manner in which the toe of the link at *B* rests against the heel of the following link at *C*. This construction brings the links into absolute contact with each other as the belt passes around the pulley so that no spaces exist between them. This form of link also enables it to adjust itself, within a limited range, to different sizes of pulleys. If the belt runs over a pulley a little larger, the flexibility of the link caused by the shape of the toe at *B* enables the link to somewhat straighten out, and the toe will rest against the heel of the following link, thus closing the gap upon a little larger circle. If, on the other hand, the belt runs on a pulley a little smaller than the one to which the belt is adjusted, the flexibility of the toe at *B* causes the belt to assume a smaller circle by means of the pressure of the heel *C* upon it. Thus, a belt made to run upon a pulley 12 inches in diameter will conform itself to pulleys ranging from 8 to 16 inches in diameter.

The manufacturers claim that this is an excellent belt for high speed work, and their sales to electric light and power companies prove their assertion.

OUR ALBANY LETTER.

INTERESTING ELECTRICAL NEWS FROM THE STATE CAPITAL.—ELECTRICAL COMMISSIONERS—TELEPHONE LEGISLATURE, ETC.

Electric Wiring.—Assemblyman Connelly has introduced a bill containing elaborate amendments to the New York city building laws. Among its provisions are the following: "Every electric wire for furnishing light, heat or power, led into any building from the outside thereof, shall be arranged with suitable appliances to cut off the current on the outside of the building. Every wire carrying electrical currents and entering any building from the outside shall have a piece of fusible wire, not less than six inches in length, placed in the path of the current outside of the building, and such piece of fusible wire shall fuse at not more than 150 degrees of heat. All wires placed inside of buildings, whether in connection with aerial or underground wires and carrying electrical currents, shall be properly insulated and shall have a magnet in circuit so arranged as to instantaneously open the circuit upon the current heating the wires in the building to 100 degrees Fahrenheit." The section relating to theatres contains this clause: "All gas or electric lights in the halls, corridors, lobby or any other part of said buildings used by the audience, except the auditorium, must be controlled by a separate shut-off, located in the lobby, and controlled only at that particular place. All suspended or bracket lights surrounded by glass, in the auditorium, or in any part of the building devoted to the public, shall be provided with proper wire netting underneath, and no gas or electric lights shall be inserted in the walls, wood work, ceilings or in any part of the building unless protected by fire-proof materials."

Senator Loughlin introduced a bill to enable gas companies to equip themselves with electric lighting plants and furnish electricity.

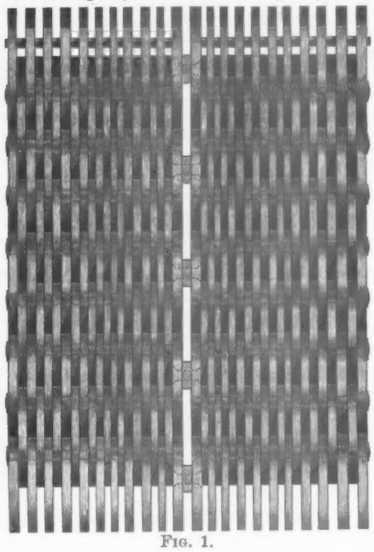


Fig. 1.

Fig. 4.

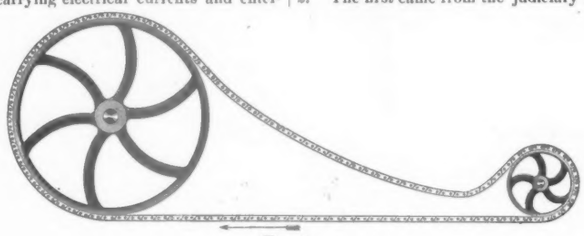


Fig. 2.

Two Bills Affecting Electric Railway Companies were reported in the Assembly April 2. The first came from the judiciary committee, and was Mr. Rice's, compelling corporations to make weekly payments of wages to their employés. It was amended, however, to make it a bi-weekly payment bill. The second, Assemblyman Kurth's, came from the committee on labor and industries. It makes 10 hours of work performed within 12 consecutive hours, a day's work on street, surface, electric and elevated railroads, in cities of over 75,000 inhabitants, and forbids a company accepting more hours, even under agreement.

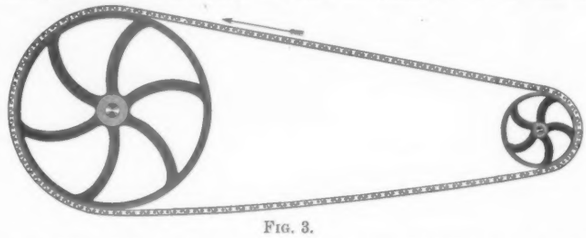


Fig. 3.

Fig. 5.

In the Assembly, General Curtis's bill, abolishing the death penalty came up on second reading April 2. Mr. Tompkins made a long speech in favor of it, saying Mr. Curtis had introduced the bill from the most humane motives, and to say that he was working in the interests of an electrical company, was wrong.

In the Senate, April 3, the report of the general laws committee on electric lighting and the use of electricity for power, was a general order.

Mr. Erwin, chairman of the committee, said that the bill to be introduced would provide for a supervision of electricity in use, similar to that now exercised over steam boilers. It would simply subject electric appliances and currents to inspection.

The report was adopted, and 5,000 copies ordered printed.

Telephone Rentals—Assemblyman Kerrigan introduced a bill, making telephone charges in cities of over 500,000, $6 a month; in cities between 100,000 and 500,000, $3.75 a month; in cities less than 100,000, $2.75 a month.

A hearing on the Clarke telephone bill brought out many arguments for reduction of rentals.

A Flood of Electrical Bills.—To-day, April 4th, was the biggest of the season for electrical legislation. The Senate passed Mr. Jacobs' bill for lighting New Utrecht by electricity, and Senator O'Connor introduced a bill authorizing the trustees of villages to contract with electric light companies for street lighting.

In the Assembly, the committee on gas, water and electricity, reported Senator Van Gordon's bill allowing the Lockport Water Company to supply electricity and to take power from the Niagara River. The bill is amended so that the operations of the company are confined to Niagara, Orleans and Erie counties. The company is also to be subject to the general laws of the State and the municipal laws of the cities where it supplies electricity. When the bill was reported, Mr. Connelly moved to disagree with the report, for the bill was the same as that of Mr. Kill, which the Assembly had knocked out Monday night. Mr. Husted said the bill was not killed; it was simply recommitted and the committee had reported instead the Senate bill. Mr. Andrus suggested that the bill first be printed, and Mr. Connelly agreed.

The committee on internal affairs made a favorable report of Mr. Weed's bill to provide for the lighting of the streets of Flatbush with electricity.

Electrical Commissioners.—Assemblyman Nolan introduced a bill creating a board of three commissioners to be a State Board of Electrical Control, to be appointed by the Governor and confirmed by the Senate. One shall hold office for three, one for four and one for five years. One shall be chosen from the party casting the largest number of votes for Governor at the last election, and *one shall be an electrical expert.* After the expiration of the first term, the terms shall be five years. A commissioner may be suspended by the Governor when written charges are preferred against him. The board shall have a secretary, appointed by the Governor and confirmed by the Senate, for five years. If the expert commissioner is from one political party, the secretary must be from the other. The secretary shall be the executive officer of the board. The board can summon witnesses, who may be liable to action for contempt. The secretary shall receive $4,000 a year. Neither he nor the commissioners shall be employed by or have any interest in any firm or corporation having to do with electrical matters. The principal office of the board shall be in Albany, and the commissioners shall meet at least once in a month. Their proceedings shall be published in a report to the legislature. The board shall have supervision of all telegraph, telephonic, electric wires, motors, subway conductors or conduit associations, and all corporations or associations using electric fluid for public use or commerce. The board shall keep itself informed how these enterprises are conducted as regards security for life and property, and accommodation of the public; and shall also investigate accidents. Before any examination, the board shall give reasonable notice. No exclusive privilege shall be granted any company or person by which a monopoly may be created, or competition prevented on equal terms. The annual salary of each commissioner shall be $8,000.

H. L.

Albany, N. Y., April 5.

Lecture by Prof. Elihu Thomson.

HE IS INTRODUCED AT COLUMBIA COLLEGE BY PRESIDENT SETH LOW AND DELIVERS AN ABLE ADDRESS.

Last Wednesday evening the American Institute of Electrical Engineers, held its regular monthly meeting, under the auspices of Columbia College.

The Hon. Seth Low, president of Columbia, in a few well chosen words, welcomed the Institute to New York's oldest learned institution, and defined, in a way that must have been gratifying to every electrician present, the attitude of the College towards the study of electricity as a science and electrical engineering as an art. President Low's remarks were followed by applause, which re-echoed again upon his introducing Prof. Elihu Thomson, who spoke without notes, illustrating his remarks on electro-magnetic phenomena, with a number of interesting and unfamiliar experiments, in the performance of which he was ably assisted by Mr. E. Wilbur Rice.

The following is a very brief outline of Prof. Thomson's lecture and experiments:

The experiments of this evening will have to do with the phenomena of alternating induced currents in closed circuits. We are all familiar with what will happen if we wind a bar of soft iron spirally with an insulated wire through which we pass a current of electricity. Almost instantly the bar will become a magnet whose north and south poles will change almost instantly upon the reversal of the current. This development of polarity or change of polarity is not quite simultaneous with the closing or reversal of the current because of the slight reluctance of the iron to become magnetic or change its magnetization, often called the magnetic lag, molecular friction, change of stress, hysteresis. Still the magnetization or change of magnetization is very rapid. Now if we surround the iron bar and its spiral winding of insulated wire with a copper tube or a ribbon of uninsulated copper, which amounts to the same thing, we find that upon closing the circuit in the insulated wire the iron has become magnetic much more slowly than before. In other words the copper ribbon has retarded the magnetizing effect of the current. The explanation of this is really very simple. It is because induced currents have been set up in the copper ribbon or tube which oppose and retard for a short time the current in the insulated wire. These opposing currents act as a resistance with this difference that they impede the current without wasting energy. Now if we send a rapidly alternating current through the spiral winding of insulated wire we will get an alternating magnetic field at either end of the bar. The period of this alternation can be varied within the widest limits. If we remove the copper ribbon or tube we find that the alternating current in the insulated wire is very much retarded by its effort to rapidly change the magnetic polarity, in other words it is retarded by its self-induction or counter electro-motive force. If now we surround the iron bar and its spirally wound insulated wire with the copper tube we find that the retardation is almost wiped out; and if the copper tube is free to move longitudinally along the bar we find that it has a tendency to move in certain directions under certain well-known conditions. In the place of the copper tube we may use a copper ring, which may be regarded as a very short tube. The cause of this motion is because the induced currents in the ring are in an opposite direction to the inducing current in the wire, and opposite currents repel one another.

The lecturer here exhibited a powerful electro-magnet standing vertically, over the end of which he slipped a massive copper ring: upon closing an alternating current through the coils of the magnet the ring was shot violently into the air by the opposing induced currents therein. A copper plate, which may be regarded as a number of concentric rings nested one within the other, was balanced against gravity over the pole of the magnet and upon closing the circuit the plate was seen to be repelled from the pole of the magnet. A copper ring was also balanced in mid-air over the pole of the magnet, supported only by the opposing force between it and the magnet.

A copper ring was mechanically held over the magnet pole and another similar ring was placed beneath it which was found to be held up against the mechanically supported ring, the two rings giving off a musical sound as they were thrown apart and forced together many hundred times a second.

A coil of insulated wire, to the terminals of which were attached an incandescence lamp, was placed over the pole of the magnet but separated from it by a considerable air space. Upon closing the alternating circuit through the magnet coils the lamp connected with the supersupported coil became incandescent, its brightness varying as the distance between the magnet and the coil was varied. A massive copper plate was now partially introduced between the magnet and the coil connected with the lamp when the lamp was seen to burn dim, its dimness being greater as more of the magnet pole was covered by the copper plate.

The coil and its attached incandescence lamp were then balanced against gravity over the magnet pole: upon introducing the copper plate between the magnet pole and the superbalanced coil and lamp the degree of brilliancy of the lamp was seen *not* to vary as might have been expected, but the coil and lamp, which were on the end of a steelyard arm, rose and fell as the copper plate was more or less introduced between them and the magnet pole, they being nearest the magnet pole when the copper disk was farthest introduced.

The lecturer here explained how this tendency of an alternating magnetic field to repel a closed metallic circuit has been used in the construction of motors, meters and other apparatus.

Prof. Thomson then performed a series of experiments with a copper ring, and disks of copper and iron free to rotate on jewelled centers, in the field of the electro-magnet whose coils were being traversed by an alternating current. These experiments depended upon the copper ring being *not quite* concentric with the magnet. By holding the copper ring a little to one side and introducing the edge of the disk of copper or of iron between it and the magnet pole the disks were seen to revolve. The same phenomena took place when a thick sheet of copper (which may be regarded as a number of concentric rings) was used in place of the copper ring. In fact any closed circuit slightly eccentric from the magnet pole set the disks rotating when their edges were placed above or below it. There was however this difference between the behavior of copper disk and that of iron; the copper disk only rotated when approximately perpendicular to the magnet pole while the iron disk rotated when held vertical with the axis of the magnet when the copper plate was placed between it and the magnet and slightly eccentric with the latter. The behavior of the iron disk was due to its magnetic lag, a property not possessed by the copper disk. The iron disk does not quickly receive the changes of polarity caused by the alternating field and as the eccentrically placed copper plate prevents the same degree of magnetization of its vertical halves the disk rotates away from the side of greater repulsion.

The copper plate was substituted by the copper disk over which the iron disk was placed vertically, when both disks were seen to revolve.

An ordinary steel file was placed on the magnet pole, projecting longitudinally a little more in one direction than in the other and upon two copper disks being placed in the same plane over it, perpendicularly to the magnet they were seen to revolve as though geared together. Two iron disks rotated similarly if placed over the file either perpendicularly or horizontally.

A cast iron ring a small sector of which was wound with a closed circuit of insulated wire, when placed over the magnet pole so that the winding was slightly to one side, caused the disks to rotate because of its unequal magnetization. Professor Thomson very aptly described the lines of force traveling unequally around the cast iron ring as invisible brushes unequally brushing against the two halves of the disk free to rotate and causing it to turn away from the brush which brushed the hardest.

A cast iron ring lying flat upon the table was then shown through which was cut a slot and on either side of the slot were windings which were unequal. When the edge of the disk free to rotate was placed in the slot the disk was seen to turn round. A silver coin which was a good conductor was then placed in the slot when it was seen to be thrown out violently in a line parallel with the axis of the ring. A counterfeit coin which was a very poor conductor was not similarly affected.

Returning again to the vertical electro-magnet the lecturer placed over the pole a copper disk on which was placed a hollow copper ball which was seen to rotate in one direction when the copper plate was slightly eccentric on one side of the pole: upon moving the copper plate so that it was eccentric from the other side of the pole the ball rotated in the opposite direction. A massive copper ring with a diaphragm of mica was substituted for the plate under the ball, which was seen to rotate the same as before. But a more surprising phenomenon was manifested when the hollow copper ball, free to turn in and surrounded by a massive copper ring, was placed directly on the magnet pole: the ball turned over and over as though it were rolling on a flat surface.

Over the magnet pole was placed a vase of water with the copper ball floating therein. The ball did not rotate until a copper plate was partially introduced between the bottom of the vase and the magnet pole. A round bottomed copper dish partly filled with water in which floated the copper ball was itself floated in the glass vase of water, both the dish and the ball rotated upon the massive copper plate being partially introduced under the vase as before.

A wedge of iron was laid upon the magnet pole, and over it was placed tangentially a cylinder of brass with an iron core. The cylinder which was supported upon axially arranged bearings rotated with great rapidity.

The cylinder of brass above described was axially supported in a ring, slightly inclined from the vertical, which was attached to a metal bar with a counterweight at the other extremity, the whole being balanced with a jewelled bearing on a needle point in the centre of the magnet pole. The brass cylinder revolved rapidly and the whole apparatus, that is, the cylinder, the brass ring in which it was hung, the arm and counterweight on which it was supported revolved axially with the electro-magnet over which it was superpoised, the same as the ordinary gyrascope.

In conclusion Prof. Thomson forcibly alluded to the marvelous capacity for transference of energy which electro-magnetic induction is capable of. If copper is kept at a very low temperature by artificial means its resistance becomes so small that enormous amounts of energy can be transmitted with ease. In the case of a current in a wire but a very small part of the energy is confined to the wire itself.

The lecture was listened to with the closest attention by a larger audience than usually gathers at the monthly meetings of the Institute; the experiments were performed with a manual dexterity which won for the lecturer repeated and well deserved applause.

—— The Westinghouse alternating current arc light system, the special features of which are that it is used in connection with a single flat carbon lamp, is now being introduced in the city of Pittsburgh. Last Sunday night, about 60 of the lamps were operated in the east end of the city, and a number of prominent men and the representatives of the local papers were invited to witness the innovation in street lighting. In speaking about the matter the next day, one of the Pittsburgh papers said: "The new system of arc lighting of the Westinghouse Electric Company was successfully tested in the East End last night. In this system but one carbon is required to each lamp, which lasts 42 hours. The light from these lamps is 20 per cent. brighter than that from the old lamps, and much steadier. The machines can be manufactured to generate electricity for 250 arc lights, thus affording a great deal of economy of space. The system is also claimed to be perfectly safe, because it is operated with the converter which reduces the voltage of the current to such an extent as to render any accidental shock perfectly harmless."

ELECTRIC LIGHT NEWS

—— The recent strike of linemen in Omaha has been compromised, and the men have resumed work.

—— After a several days' test in competition with lamps of other make, the St. Louis Board of Public Improvement have adopted the Wood arc lamp for use on the streets of that city.

—— The Gill-Alexander Electric Manufacturing Company, of Kansas City, re-elected its board of directors last week. They are: Robert Gillham, W. W. Alexander, E. R. Gill, M. C. Gillham.

—— The Goodyear Rubber Works, Providence, R. I., which have been laying idle for quite a while, are about to be started up again by a new electrical concern. The new company, which is formed of Boston capitalists, will have a capital of from $25,000 to $50,000, and will manufacture insulated electric wire.

—— At the meeting of the stockholders of the Allegheny County Light Company, of Pittsburgh, held last week, it was voted to increase the capital stock of the company from $500,000 to $1,000,000. According to an official, the enlarged and rapidly increasing business of the company made such a step necessary.

—— The Edison Electric Illuminating Company, of Cumberland, Md., has just placed an order with the Westinghouse Electric Company, of Pittsburgh, for one 45-light dynamo of the new alternating current arc type, which has been attracting considerable attention of late among electric lighting people.

—— The Westinghouse Electric Company closed an order the other day for a 750-light alternating current incandescent dynamo to go to the town of Girard, Kan. The company buying the incandescent machine has also decided to invest in a 25-light arc dynamo of the Westinghouse Company's new type. So that Girard will soon be a well lighted town.

—— The University of Pennsylvania proposes to erect an extensive plant for the heating, lighting and ventilating of all of the buildings. In the rear of the main college hall a central boiler house and other houses will be built, supplied with a 900 horse-power boiler and dynamos, from which steam and electricity are to be carried to each building, lighting 3,000 lamps, driving the ventilating fans and feeding the radiators.

—— Out in Omaha the other night, the light of 100 new arc lamps pierced the darkness. This was the reason the Omaha *Bee* buzzed in the following joyous strain:

"The poor old gas jets upon the scores of newly lighted corners turned a sickly yellow and cast dismal shadows in the dazzling presence of their mysterious successor. Beautiful women were made still more beautiful, and the homely were improved, as they passed and repassed in the whitened flood of light. Tough characters scowled and hissed forth curses at having their dark path made clear even as the day. But the lovers of light were happy and thousands of them were heard to exclaim, 'How perfect! How delightful!'"

—— Says the London *Electrical Review*: The commission of experts appointed by the municipal authorities of Frankfort, to consider the best methods to be adopted for electrically lighting the city, have evidently given careful study to the question. The experiments are the most interesting examples of what the alternating current motor is capable of accomplishing even in this early stage of its career that we remember to have seen, and the continuation of the report will, we think, be awaited with much interest. Certainly the tests are calculated to give satisfaction to the advocates of alternating current transmission of power, and to encourage them to still greater efforts to secure the best possible results.

ELECTRIC CLUBS.

WHAT THE ELECTRIC CLUB MEN ARE TALKING ABOUT.—THE GENERAL SUCCESS OF THESE ORGANIZATIONS.

No one feature of the development of the electrical industry is more indicative of its extent and progress than the existence and advancement of the Electric Clubs of the country. The three leading organizations, in New York, Chicago and Boston, after the usual period of uncertainty and weakness, may now be considered, we think, as firmly established, with bright and successfull futures ahead. The welcome these organizations received from the best men in the science and in the practical work, has caused other cities to strive to emulate these successes, and we hear of new Clubs in various parts of the United States The REVIEW shall be pleased to hear from all these, and will aid in every possible way to advance their interests. The progressive minds of the country are looking towards electricity and its wonderful work, and the meeting and congenial mingling of these scientists and practical workers cannot fail to assist in a general advancement all along the line.

New York Electric Club.

The Last Meeting of the present board of managers was held Thursday evening of last week. Several new members were elected, and a report for the year decided upon for the annual meeting.

Two Declinations have so far been reported to the secretary by gentlemen named for honors at the annual meeting, the gentlemen declining expecting to be absent from the city the greater protion of the ensuing year. Here's a chance for others possessed with ambitious minds.

Passed Assistant Engineer H. Schuyler Ross, of the Club, who was recently ordered before the Philadelphia board for examination for promotion to the next grade, to fill the vacancy caused by the death of Chief Engineer John P. Kelly, has successfully passed. A fair idea of the extent and scope of an examination and the strain upon the candidate, may be obtained when it is borne in mind that a candidate is kept for from 15 to 20 days before a blackboard, or at a table before a board of superior officers and experts, solving intricate problems and making free-hand sketches of boilers, their engines and their valves and other parts. He must be able to show his knowledge of the practical building and repairing of steam machinery, from the laying out of designs to finishing the articles in the shop; he must know about the strength of materials, practical metallurgy, general theory and practice of iron and steel ship building, and have a general knowledge of different kinds of dynamos in use and about electricity in general.

Among Recent Out-of-town Visitors are Prof Elihu Thomson and E. W Rice, Jr., of Lynn, Mass., who were present as the guests of Mr. E. F. Peck, of Brooklyn; James D. Voorhees, Morristown, N. J.; H. Van Köhler, Stockholm, Sweden; H. D. Stanley, Bridgeport; George F. Calkin, of St. John, N. B.; F. E. Knight, of Connecticut.

A Pool Contest is now attracting much interest at the Club. The contestants are Chas. Artemas Ward Dutton and F. Zither Maguire. All betting and all games of chance are forbidden in the Club, but it is rumored that some secret pools are selling even, which, if true, would indicate the closeness of the score.

A New Steward has taken charge of the Electric Club. The Club's *cuisine* has always been of the best; in fact, there are a number of members well acquainted in New York city, who think the Electric Club is not excelled by any of the famous cafés and restaurants in the city, and the new steward is determined that the Club's reputation in this line shall be kept up.

Chairman Chamberlain, of the house committee, is an indefatigable and enthusiastic worker, and is constantly on the alert for the best interests of the Club. It is not generally known that Mr. Chamberlain, besides being an electrician of ability and experience, is an athlete of no mean prowess, and has been for two summers chairman of the house committee of the well-known Marine and Field Club, of Bath, L. I.

Probably the Most Interesting Personage in this short life is the Club "kicker." When he is consistent he is a valuable member of any club, but this fine jewel is as rare in the kicker's action as it is generally reputed to be in life among the outside barbarians.

The Chief Topic at this Club for the past week has been the consolidation of the parent electric lighting interests. It seems to be the general opinion that an alliance has been effected, or is being effected, between the Edison, Thomson-Houston and Sprague interests. The rumor that Mr. Westinghouse will also become a member of the combination is disbelieved by some and believed by others. It is quite generally recognized that the union of men of such great executive ability and progressiveness as George Westinghouse, C. A. Coffin and Henry Villard, will be one of tremendous power and influence. The difficulty which would occur to any one acquainted with the business is that of having all these vast interests work together in harmony.

Boston Electric Club.

Mr. J. J. Carty, of New York, was a guest at the Club rooms on Friday evening.

The Pool Tournament is nearing its close. Mr. A. P. Wright has tied Messrs. Harrington and Steele for first prize.

Mr. Arthur B. Griggs is conceded to be the chief among the aspirants for cribbage honors.

Mr. Alex. P. Wright, secretary of the house committee, provides many pleasant surprises for patrons of the *cuisine*.

Next Club Dinner will be given at the Quincy, Monday evening, April 14. The address to be delivered on that occasion will be by Jos. Wetzler, New York.

The Ladies' Night eagerly looked forward to as the Club's greatest social event of the season, will take place at the Club rooms at an early date.

The New England Electric Exchange held its periodical examinations in the assembly room of the Club, on Wednesday afternoon, April 2. Upwards of 20 applicants for a certificate of competence were examined, and the majority of them made a creditable showing.

Chicago Electric Club.

Applicants for Membership have been numerous of late, and quite a list of resident and non-resident gentlemen are awaiting the action of the Club.

The Annual Election of officers of the Club occurs on the third Thursday of April, the same date on which the New York Club holds its annual meeting. The ticket that has been placed in nomination is as follows: President, Frank G. Beach; vice-presidents, F. B. Badt, Alex. Kempt, D. P. Perry, Wm. H. McKinlock; secretary, W. A. Kreidler; treasurer, F. S. Terry; managers, B. E. Sunny, M. A. Knapp, F. W. Cushing, George O. Fairbank, William Taylor, F. E. Degenhardt, E. Baggot, F. W. Parker, George C. Bailey, H. A. Glasier; membership committee, C. C. Haskins, George Cutler, Fred. De Land.

The Regular Meetings of this Club, as a rule, are held Monday evenings, and are quite well attended. It will be noticed that a number of the present officers have been re-nominated, and it is thought that the ticket as above will be elected.

Harvard Electric Club.

Harvard University, Cambridge, Mass., has a successful Electric Club. It began a little over a year ago with four members, now it has about 50 members and has given two public lectures to audiences of 200 to 300. The Club has gained a high position among the many clubs of Harvard, and the members very justly feel a little proud of the progress made.

A Recent Able Lecture was by Captain Eugene Griffin, of the Thomson-Houston Company, on "Electrical Transmission of Power," before a large audience. The lecture is noted at length elsewhere.

Cincinnati Electric Club.

Mr. W. H. Jones, the well-known electrician and electrical manufacturer, is president of this organization. Meetings will be resumed again this Fall, when an increased interest is expected.

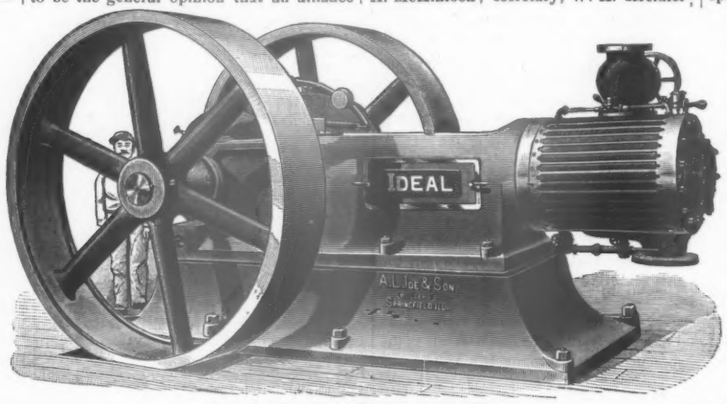


FIG. 2.—ANOTHER VIEW OF THE SAME.

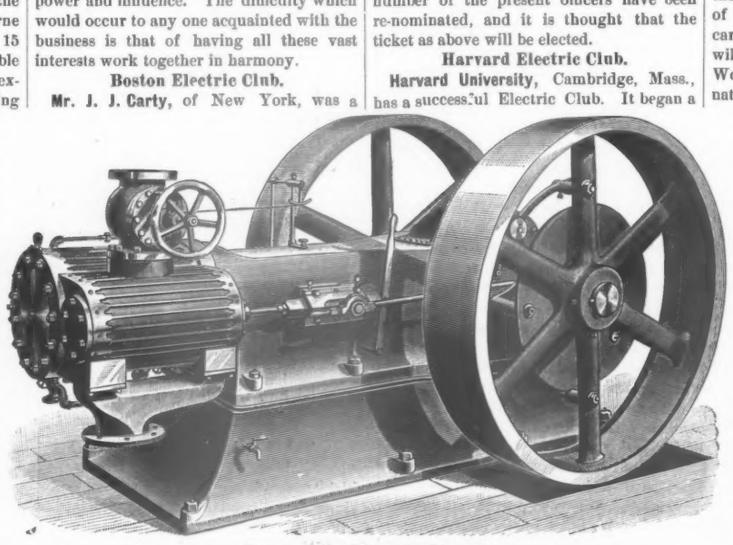


FIG. 1.—THE NEW IDE ENGINE.

The "Ideal" Engine.

On this page will be found two views of the "Ideal" special electric street railway engine, designed and placed upon the market by A. L. Ide & Son, of Springfield, Ill., for central power station and electric light uses. It is a special, heavy engine, and the cuts illustrate the 200 and 350 horse-power sizes. All the working parts are steel and bronze. It is self-contained, perfectly balanced, and when set upon the sub-base, the wheels clear the floor. A special claim made for it is that it is the only self-oiling engine which permits of being opened while running, giving the same opportunity for adjusting as with the ordinary "oil cup" engine.

Each engine is carefully tested and the speed adjusted before it leaves the shops. The automatic governor is claimed to be the most simple regulating device in use and to produce a regulation that has not been equalled.

The connections to valves are straight lines, giving direct positive motion with the least friction, and dispensing with numerous rocker shafts, etc. The range of cut-off is wide and enables the engine to carry a load largely in excess of rated power, as the point of cut-off is automatically extended to three-fourths stroke when the increased load requires it. This is an important feature in electric street car work, where the load is subject to wide and frequent fluctuations; the engine readily meets this extra requirement and quietly carries the load, maintaining a constant speed and thus giving the full power to the motors.

The cylinder relief cap, with which these engines are fitted, is of great value; the makers claiming, that, with its use, the wrecking or damaging of the engine, by water entering the cylinder, is an impossibility.

The Lenox Lyceum Electrical Exhibition.

Preparations are progressing rapidly for the opening of the exhibition, which will be of a strictly non-commercial nature. No cards will be distributed, and no flaring signs will offend the eye. The managers of the Woman's Exchange were especially fortunate in securing the services of Mr. L. Stieringer, whose experience in all branches of the electrical business is well known. Mr. Stieringer upon being requested to officiate as *generalissimo* by the ladies, gallantly came to their aid, and has devoted much of his time to the arrangement of special features and details. The exhibit will include the whole of Mr. Edison's collection shown at the Paris Exposition, besides many new and interesting features.

Near the entrance will be the most complete exhibition of the phonograph and its many uses, ever attempted.

Late comers who are unable to gain admission to the Casino can visit the Lenox Lyceum during the progress of the electrical exhibition and hear the entire performance of "The Grand Duchess," by the aid of the telephone. Mr. Rudolph Aronson has arranged for the placing on the Casino stage of a mammoth transmitter capable of sending every note of the music and all the dialogue to a room at the Lenox, fitted up with photographs of the entire company in costumes and the several scenes of the opera, so that the eye can look upon the scenes and characters while the ear listens to the music.

In the center of the main floor is a large column completely covered with incandescent lamps. From the top of this pillar of light, numerous streamers of lamps and flowers intertwined, stretch away to the sides of the room. These lamps will be in various colors and by an ingeniously arranged switchboard, can be flashed alternately, all at once or in various colors. This is a feature of great interest to every electric light man.

"A Glimpse into the Twentieth Century," *a la* Bellamy, will be offered to every visitor, all the future sights will be directly connected with electricity in some form or another.

The REVIEW will describe this interesting exhibition in detail as soon as all the interesting objects are in place.

KINDRED INTERESTS

The Thomson-Houston Electric Company, Boston, Mass., has just issued a neat catalogue, printed in Spanish and fully illustrated, showing the company's lighting and motor apparatus. The catalogues are to go principally to the Spanish-American countries, where electricity is being adopted very extensively. These countries are next to the United States in adopting electricity for lighting and motor purposes.

The Tropical American Telephone Company, Limited, which is the sole legal representative of Prof. Bell, Francis Blake and magneto bell inventors in South and Central America and West Indies, after nearly 10 years' hard and persistent work introducing the telephone in those countries, is reaping its reward through large and frequent orders for genuine Bell instruments and supplies. Dealers, both in the United States and Europe, vainly endeavor to market cheap imitation telephone sets at very low prices, but wise managers and users have learned that it is poor economy to buy them at any price, where good service, durability and reliability are essential, as in the telephone business. This company recommends the genuine as cheapest and best always. A new circular, setting out its exclusive rights, patents and concessions, is being printed for the better information of the general public.

The Westinghouse Electric Company reports the following very good showing in central station business for the month of March, 1890: INCANDESCENT LIGHTS.—Tampa, Fla., 500 (increase); Bluff Point, N. Y., 1,500; Kewanee, Ill., 750; Warren, Ohio, 750; Rochester, Pa., 500; Shelby, N. C., 500; Methuen, Mass., 750; Mount Morris Company, New York, N. Y., 1,500 (increase); Canton, Mass., 750; United Electric Light and Power Company, New York, N. Y., 15,000 (increase); Hoquiam, Wash., 750; Boston, Mass., 3,000 (increase); Fort Collins, Colo., 750; Girard, Kan., 750; Auburn, Me., 1,500 (increase); Wilmerding, Pa., 1,500.—Total, 33,750. ARC LIGHTS.—Warren, O., 105; Joliet, Ill., 65; Methuen, Mass., 40; Nashville, Tenn., 540; New York, N. Y., 135 (increase); Hoquiam, Wash., 50; Cumberland, Md., 45; Girard, Kan., 25; Boston, Mass., 125 (increase); Harriman, Tenn., 60; Canton, Mass., 35.—Total, 1,215 lights.

The Wainwright Manufacturing Company, of Massachusetts, is a new corporation, organized in 1889, under Massachusetts laws. Capital, $100,000, with the following officers: Jere. Abbott, president; John A. Loring, vice-president; Geo. D. Hall, Jr., treasurer and manager: Bicknell Hall, assistant manager; John F. Fife, superintendent; and F. H. Lovejoy, sales manager. This company succeeded the Wainwright Manufacturing Company, of Medford, Mass., and continues the manufacture of surface condensers, feed water heaters, separators, Harvard pump regulators, expansion joints, corrugated copper and brass tubing, besides doing a general foundry and machine business. The general office and works are situated at Medford, Mass., five miles from Boston, on the western division of the Boston and Maine Railroad, covering several acres of land, with 800 feet of sea wall front, enabling 300-ton vessels to discharge coal, iron and coke into the yard, very close to the foundry. The Boston offices are at 34 Oliver street, and the company has branch offices in all the leading cities. Beautiful lithograph-illustrated catalogues will be sent on application.

A. L. Ide & Son, Springfield, Ill., report the following sales of their well-known engines: College Park Electric Belt Line, Sherman, Tex., one 100 h. p. Ideal engine, boiler and fixtures; Forest City Electric Light Co., Rockford, Ill., one 150 h. p. Ideal engine; Moffett, Hodgkins & Clarge, Syracuse, N. Y., one 100 h. p. Ideal engine (second order); English, Morse & Co., Kansas City, Mo., one 25 h. p. Ideal engine, one 40 h. p. Ideal engine, two 50 h. p. Ide engines; Muscatine, Ia., Gas and Electric Light and Power Co., one 65 h. p. Ideal engine; Jacksonville, Ill., Gas Light and Coke Co., one 80 h. p. Ideal engine (third order); Carroll & Powel, St. Louis, one 100 h. p. Ideal engine (second order); Greenview Coal Co., Greenview, Ill., one 50 h. p. Ideal engine; W. J. Wilcox Lard and Refining Co., N. Y., one 50 h. p. Ideal engine; State Institute for Deaf and Dumb, Jacksonville, Ill., one 50 h. p. Ideal engine; Colorado Electric Supply and Motor Co., Denver, Col., one 15 h. p. Ideal engine; Peter Schmidt, Milwaukee, Wis., one 80 h. p. Ideal engine; Detroit Electrical Works, for street railway at Forth Worth, Tex., two 150 h. p. Ideal engines; Kewanee Electric Light and Power Company, Kewanee, Ill., one 80 h. p. Ideal engine; United Edison Manufacturing Co., Denver, Col., two 35 h. p. Ideal engines for Ames Building at Omaha, Neb.; Medical and Surgical Sanitarium, Battle Creek, Mich., one 25 h. p. Ideal engine (second order); Green, Kimble & Tallman, Vernon Center, Minn., 40 h. p. Ide engine; Thomson-Houston Electric Co., Chicago, 80 h. p. Ideal engine; Springfield, Ill., Woolen Mills, 50 h. p. Ideal engine; J. Kennard & Sons Carpet Co., St. Louis, 50 h. p. Ideal engine; Springfield, Ill., Electric Light and Power Co., one 125 h. p. Ideal engine, one 125 h. p. Ideal compound engine; Bloomington Avenue Presbyterian Church, Minneapolis, Minn., one 35 h. p. Ideal engine; Fitzgerald Plaster Co., Springfield, Ill., one 65 h. p. Ide engine; J. T. Waterhouse, Cedar Rapids, Ia., one 30 h. p. Ideal engine.

FOR SALE.—Electric Light Plant of 40 arc lights; also, machine shop and foundry, in city of Big Rapids; population, 7,000. Water-power unequalled in the State. Prosperous and well established business. Estate must be settled up is reason for selling. For particulars, address

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PROPOSALS will be received at this office until 12 o'clock M., on Saturday, the 26th day of April, 1890, for furnishing and delivery of a dynamo generator for the Statue of Liberty, New York harbor. Forms of proposal, specifications, and other information showing what is required, can be had by applying to this office. The right is reserved to reject any or all bids, and to waive any defects.

D. P. HEAP,
Major of Engineers, U. S. A.,
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NEW ENGINES.
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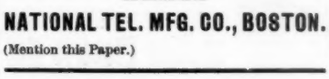

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Correspondence addressed to "ELECTRIC," care of Editor ELECTRICAL REVIEW, will receive prompt attention.

ELECTRICAL PATENTS

INDEX OF INVENTIONS FOR WHICH LETTERS PATENTS OF THE UNITED STATES WERE ISSUED ON APRIL 1, 1890.

424,451 Motor; Louis Beck, Clifton, Ill.

424,493 Tablet for telephones; John B. Morris, Cincinnati, Ohio.

424,506 Automatic railway signal; Andrew Scotland and Henry F. Brink, Maltaville, N. Y.

424,535 Electric motor; Leo Bock, Jr., New York, N. Y., assignor, by direct and mesne assignments, to himself and Chas. L. Wright, same place.

424,544 Marine electric light; Alexander G. Donnelly, New York, N. Y., assignor of one-half to Alden Solmans, South Norwalk, Conn.

424,562 424,563 Lightning arrester; Osborn P. Loomis, Brooklyn, N. Y., assignor to the Eureka Electric Co., New York.

424,575 Electrical insulation; Thos. S. Reed, Jersey City, N. J.

424,595 Regulation of electric motors; Sigmund Bergmann, New York, N. Y., and Geo. B. Scott, Lakewood, N. J.

424,606 Choking electro-magnet; Ludwig Gutmann, Fort Wayne, Ind.

424,607 Method of operating electric railways; Rudolph M. Hunter, Philadelphia, Pa., assignor to the Thomson-Houston Electric Co., Boston, Mass.

424,617 Thermostat; William P. Powers, La Crosse, Wis.

424,635 Electric call; Frank B. Wood, New York, N. Y.

424,659 Motor; Renaldo Solano, Brooklyn, N. Y., assignor of three-fourths to Jno. W. Howard and David R. Morse, same place, and Lucius G. Fisher, Chicago, Ill.

424,665 Safety device for electric circuits; Chas. G. Young, New York, N. Y.

424,684 Pneumatic telephone; Joseph G. Noreau, Quebec, Canada.

424,695 Suspended switch and traveling contact for electric railways. 424,910 Contact device and switch for electric railways. 424,911 Electric railway motor; Chas. J. Van Depoele, Lynn, Mass.

424,699 Electric car motor. 424,845 Electric railway; Edward M. Bentley, New York, N. Y.

424,703 Electro-magnet; Geo. D. Clarke, Chicago, Ill.

424,725 Electric indicator; Major D. Porter, Newton, Mass., assignor to the Porter Electric Messenger Co., of New York.

424,726 Electric indicator; Major D. Porter, Brooklyn, N. Y., assignor to the Porter Electric Messenger Co., of New York.

424,734 Electric motor; Lawrence T. Smith, Providence, R. I.

424,739 Electric switch; Chas. S. Van Nuis, New Brunswick, N. J.

424,752 Arc lamp; Ralph H. Beach, St. Paul, Minn., assignor to Chas. F. Diether, Samuel B. Diether and Peter Ruenitz, all of same place.

424,778 Ventilating system for electric subways; William Gee, New York, N. Y.

424,786 Magnetic pen holder; Edwin A. Hill, Reading, Mass.

424,809 Electrode for secondary batteries. 424,810 Electric locomotive; James F. McLaughlin, Philadelphia, Pa.

424,818 Electric-railway motor; Frank A. Perret, Brooklyn, N. Y., assignor to the Electric Mfg. Co., of New York.

424,827 Electro-medical belt; William J. Shelton, Columbia, Texas.

424,848 Electric railway; Francis S. Blackwell, New York, N. Y., assignor to the Thomson-Houston Electric Co., of Connecticut.

424,866 Arc light; Julien Duliat, Charleroi, Belgium.

424,887 424,888 Electric railway; Walter H. Knight, New York, N. Y.

424,891 Method of and apparatus for measuring alternating currents of electricity; William Lowrie, Chas. J. Hall and Harold W. Kolle, London, County of Middlesex, England.

424,921 Electrical heater. 424,922 Electrical cooking stove; John V. Capek, New York, N. Y., assignor to himself and Edw. H. Johnson, Greenwich, Conn.

424,928 Electric railway; Rudolph M. Hunter, Philadelphia, Pa., assignor to the Thomson-Houston Electric Co., of Connecticut.

424,929 Double-faced electric clock; Erick W. Lindenan, Joliet, Ill., assignor to the Joliet Clock Mfg. Co., same place.

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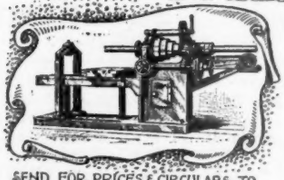

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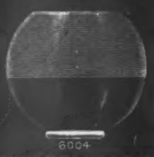
GLOBES  SHADES

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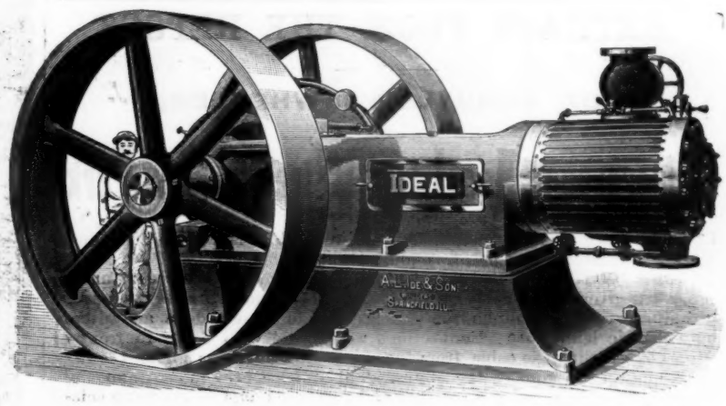

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This wire is essentially for line work, has a very high insulation, and will withstand the action of the weather without deterioration. Being thoroughly water proof and not affected by acids or gases, it is of especial service wherever a high grade of insulation is needed. The materials used in making this insulation are such that, of necessity, the wire is especially adapted to withstand abrasion and rough usage.

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— OF —

DR. SCHUYLER S. WHEELER,

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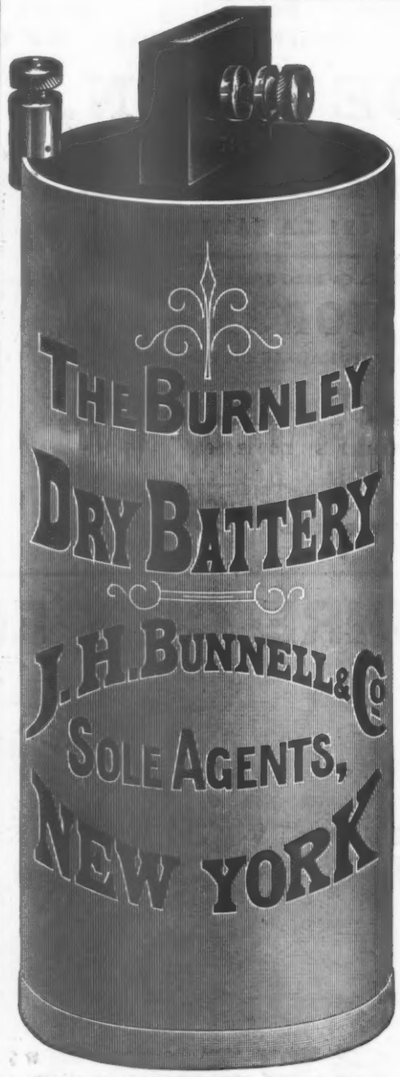

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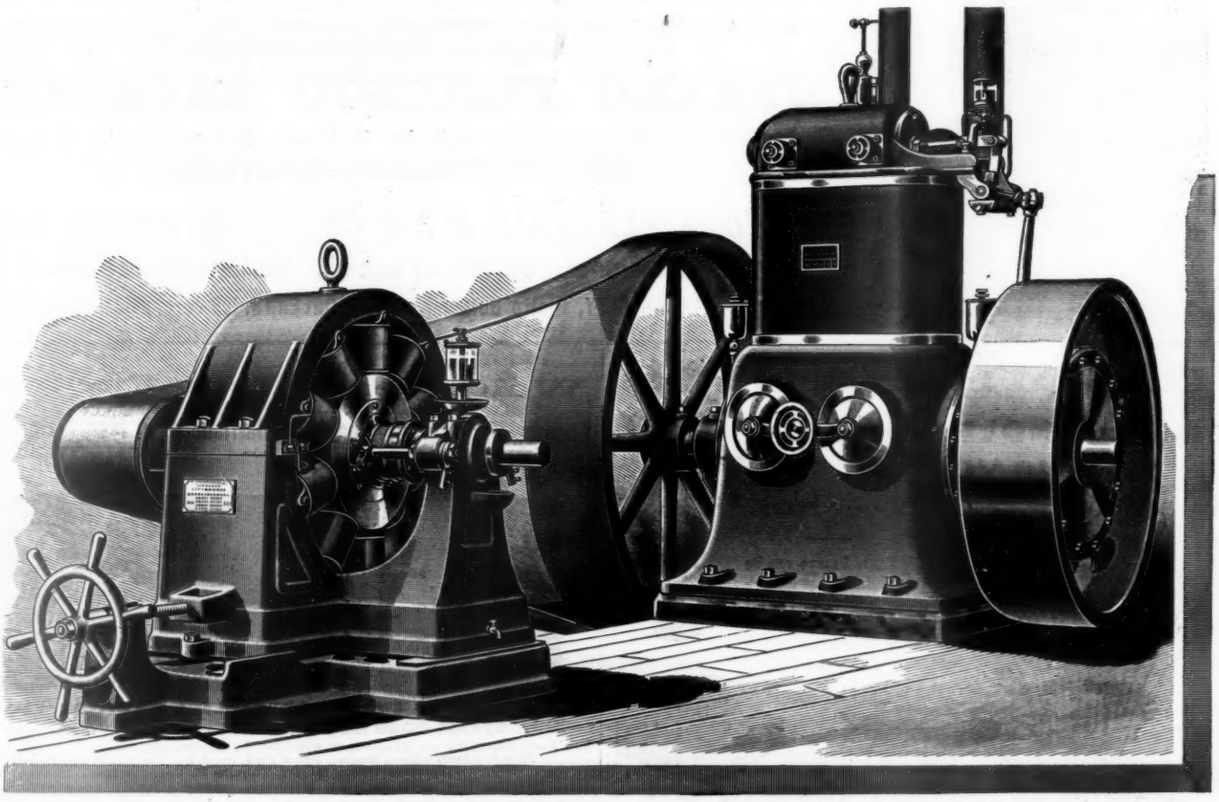

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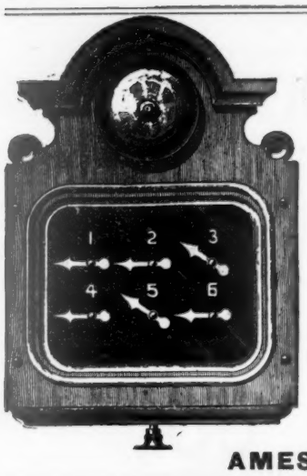

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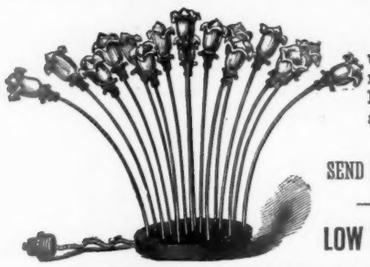

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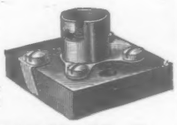

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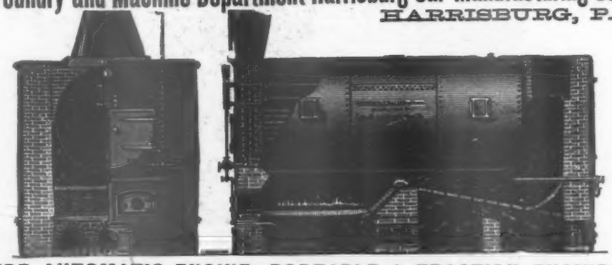

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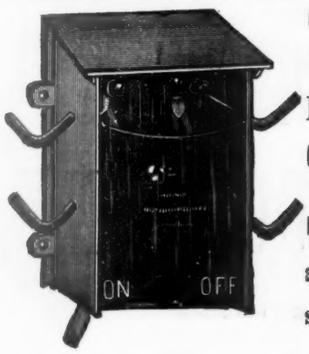

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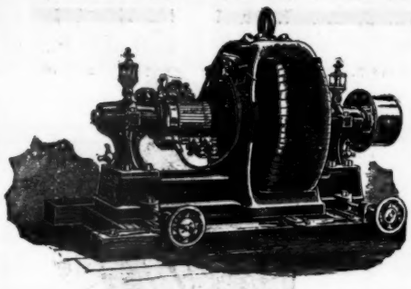

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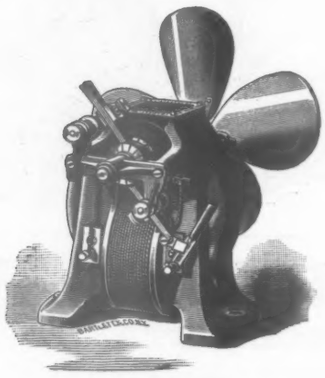

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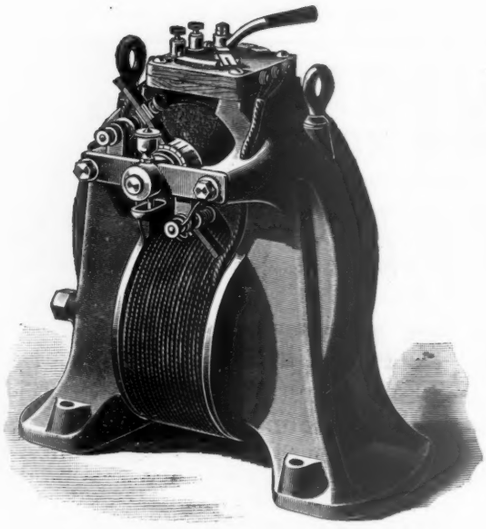

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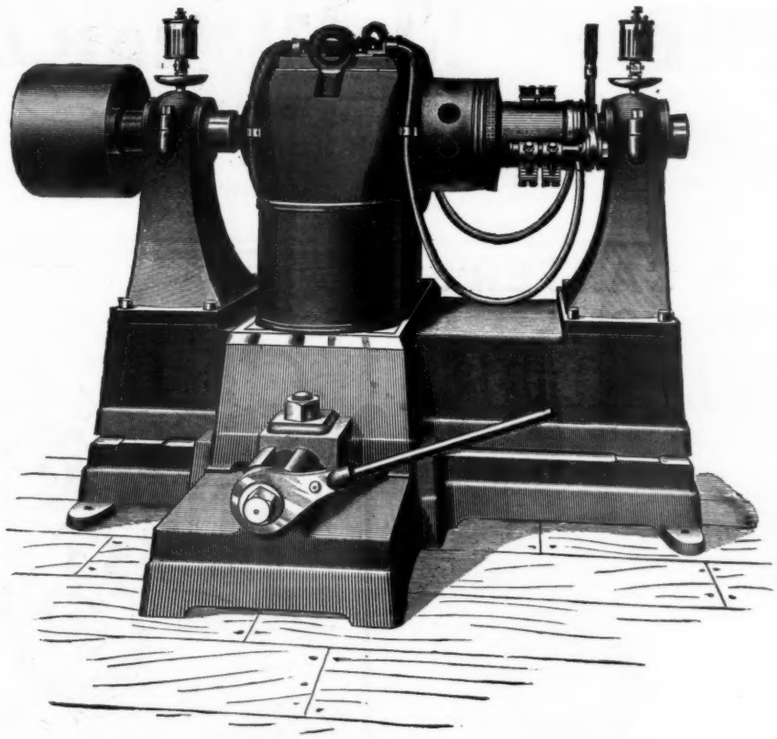

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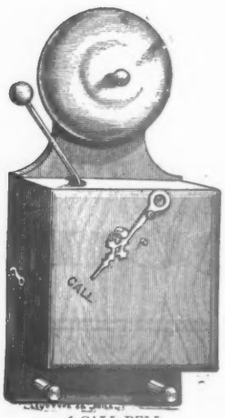

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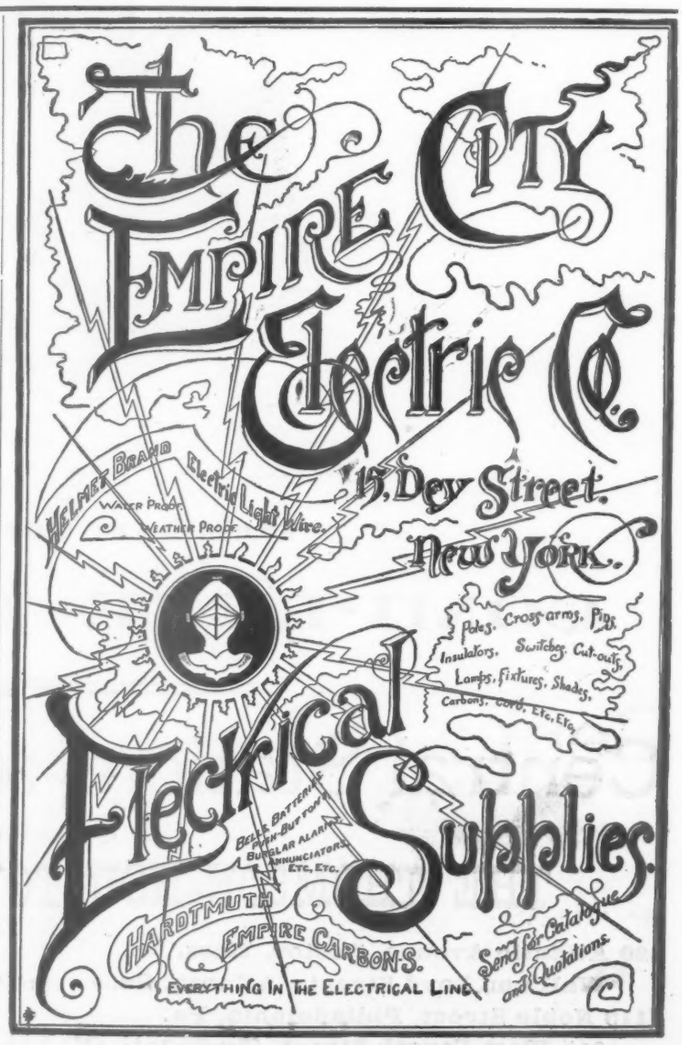

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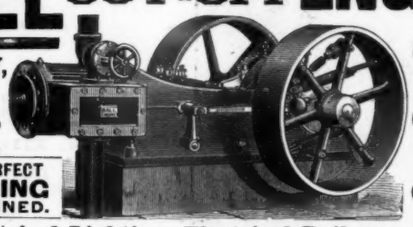

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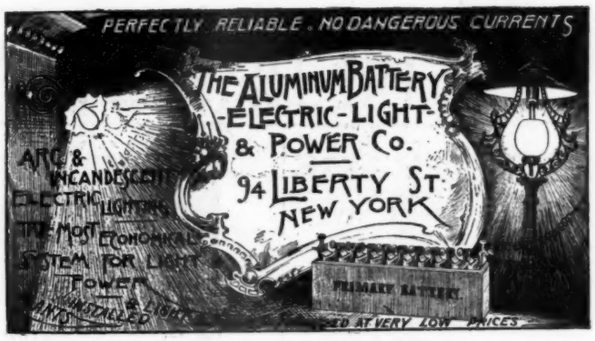

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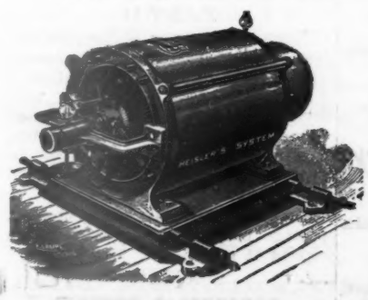

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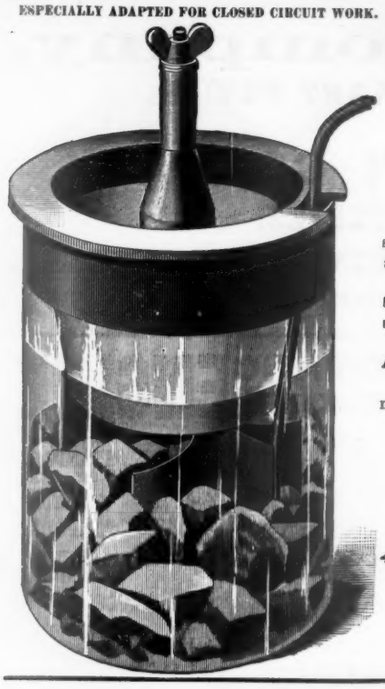

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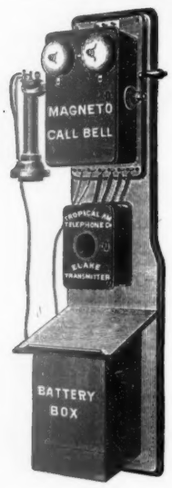

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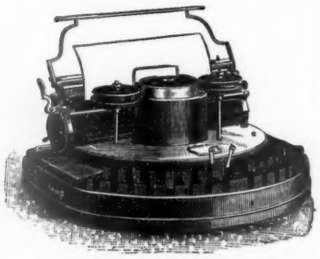

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C	.....	10	.....	.....	6.3	1¼		530
C	.....	.....	.....	25	8.0	2		530
C	16	.....	.....	.....	12.0	2½		780
C	.....	20	.....	.....	12.5	2½		780
C	.....	.....	26	.....	13.0	2½		780
C	20	.....	.....	.....	15.0	3		990
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C	.....	.....	32	.....	15.0	3		990
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H	.....	35	.....	.....	21.0	4	5,000 FEET PER MINUTE.	1,360
H	.....	.....	45	.....	21.0	4		1,360
H	.....	.....	.....	70	21.0	4½		1,360
J	40	.....	.....	.....	29.7	6		1,750
J	.....	50	.....	.....	30.0	6		1,750
J	.....	.....	64	.....	29.5	6		1,750
K	52	.....	.....	.....	38.0	8		2,290
K	.....	65	.....	.....	38.6	8		2,290
K	.....	.....	83	.....	38.0	8		2,290
K	64	.....	.....	.....	46.5	10		2,770
K	.....	80	.....	.....	47.1	10		2,770
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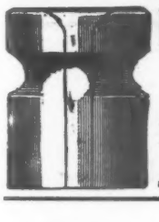

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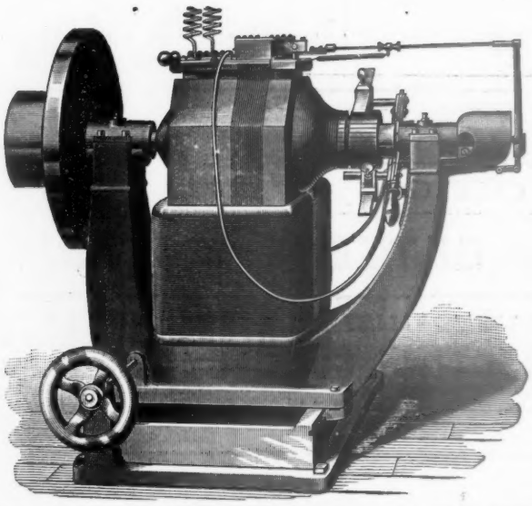

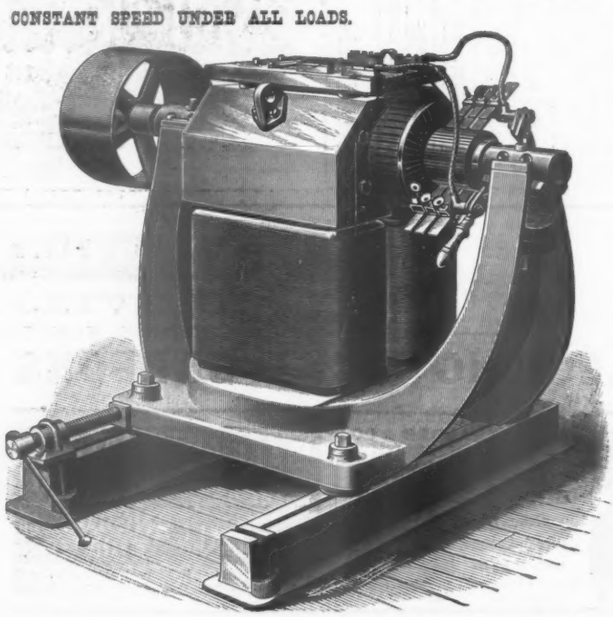

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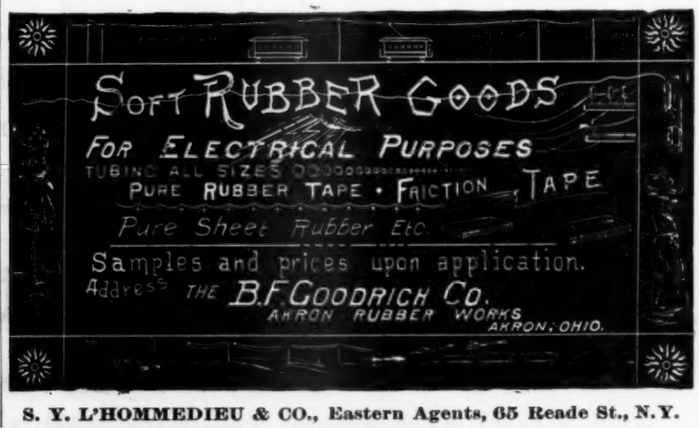

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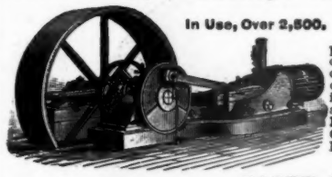

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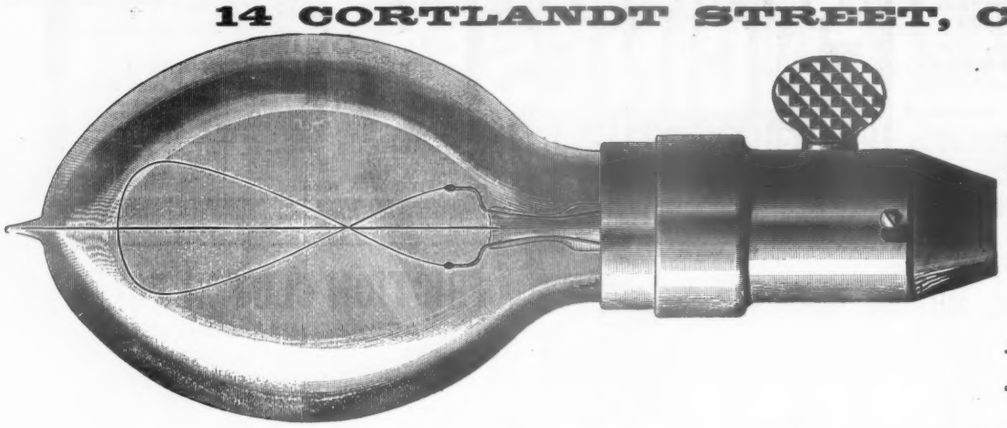

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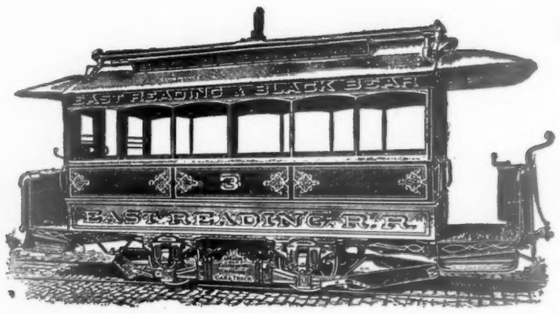

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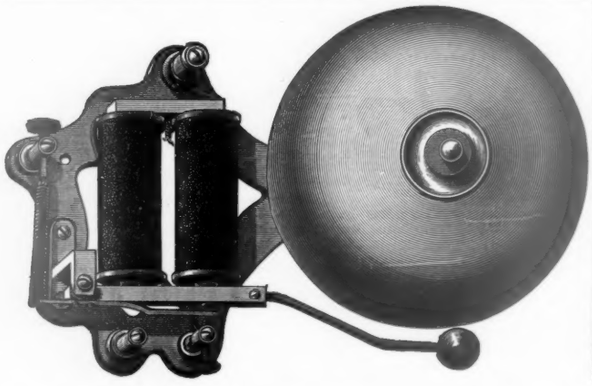

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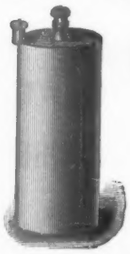

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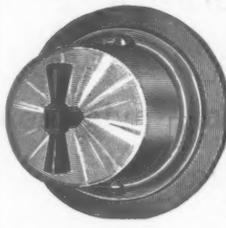

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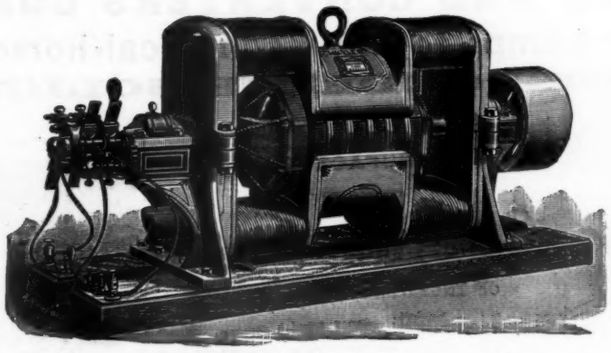

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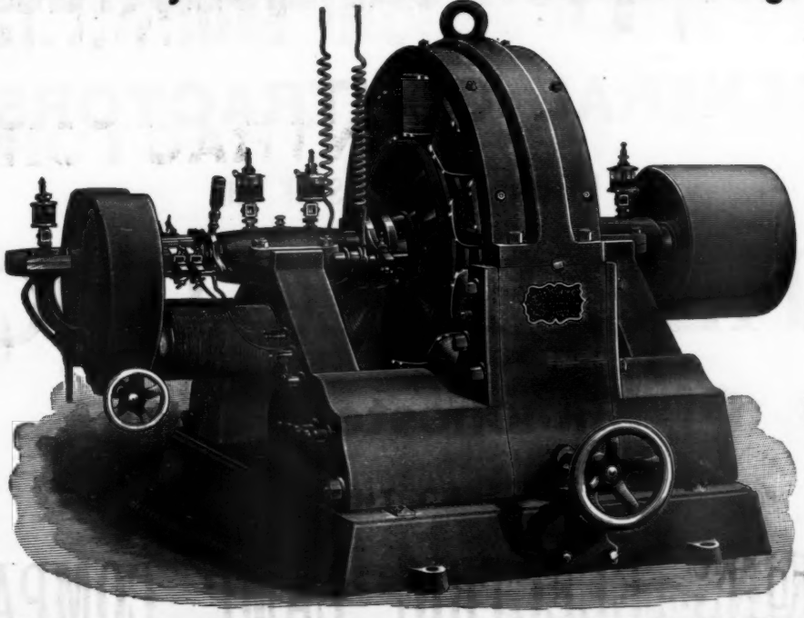

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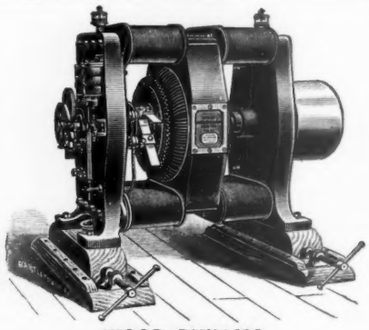

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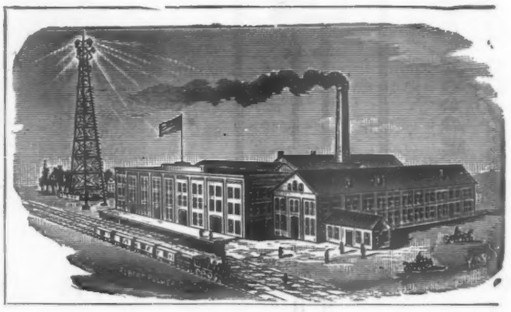

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